The Electrical Industry's Weekly Magazine November 3, 1958

Electrical World

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PLAN '59

Modernize now for growth and profits

A SPECIAL REPORT FROM McGRAW-HILL TO AMERICA'S BUSINESS EXECUTIVES

As its part in a major editorial project sponsored by McGraw-Hill's 34 business publications, Electrical World presents a series of reports on "Modernizing Electric Power Systems"

5

Modernize
INDUSTRIAL PLANTS
STREET LIGHTING
to enhance community gro

...page 51

STEVENS RICE GS W
UNIVERSITY MICROFILMS I
313 N 1 ST
ANN ARBOR MICH

HOW PROGRESS IN BUSHING STANDARDIZATION HELPS UTILITIES

New General Electric TBI* Bushings will lower utility inventory costs

Electric utilities can expect to save $5,000,000 in the next few years by cutting their bushing inventories as much as 75 percent. The savings will be the result of General Electric's company-wide effort to standardize on *only eight basic bushings* within the entire 23-kv to 196-kv ASA range. The new bushings will be directly interchangeable between power transformers, medium transformers and oil circuit breakers of the same voltage class.

The new standard transformer and circuit breaker bushings, called the TBI (Transformer Breaker Interchangeable) line, provide another weapon to fight inflationary cost trends. The TBI line will simplify ordering and stocking procedures by reducing the number of bushing ratings needed. This will permit electric utilities to reduce bushing inventories or to pool inventories within their system.

Only a manufacturer of both bushings and associated power apparatus could effect the standardization which the TBI line provides. By combining the engineering, research and manufacturing skill for its power transformers, circuit breakers and medium transformers, General Electric was able to achieve these extra values for the nation's utilities.

For more information on General Electric's TBI bushings, contact your nearest Apparatus Sales Office.

*Transformer Breaker Interchangeable. Tradename of the General Electric Co.

301-393

TBI

GENERAL ELECTRIC

MORE POWER TO AMERICA

GENERAL ELECTRIC

Electrical World

Vol. 150, No. 18 NOVEMBER 3, 1958

Published for 84 years for those engaged in the business of generating, transmitting, distributing, or applying electric power

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MANAGEMENT NEWSLETTER

Liberalized Depreciation Battle Shapes Up

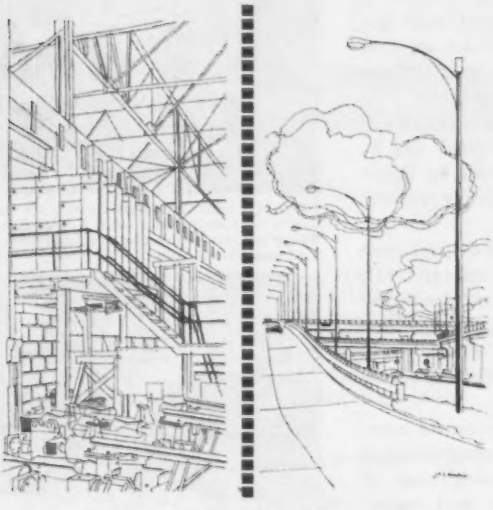
California's Attorney General, now running for governor, says utilities should pass benefits to customers.....p 95

MEETING

Utilities Urged to Study Flicker Limits

Brieger tells EEI T&D meeting that Con Ed tests indicate higher limits are permissible for voltage changes.....p 49

Special Report



PLAN '59

Modernize Industrial Plants, Street Lighting

Utilities are becoming increasingly aware of the role they must play in the modernization of the wider community. In industry, greater use of electricity must supplement manpower if production demands are to be met. On streets and highways, utilities must improve lighting to bolster community relations, increase rate of return.....p 51

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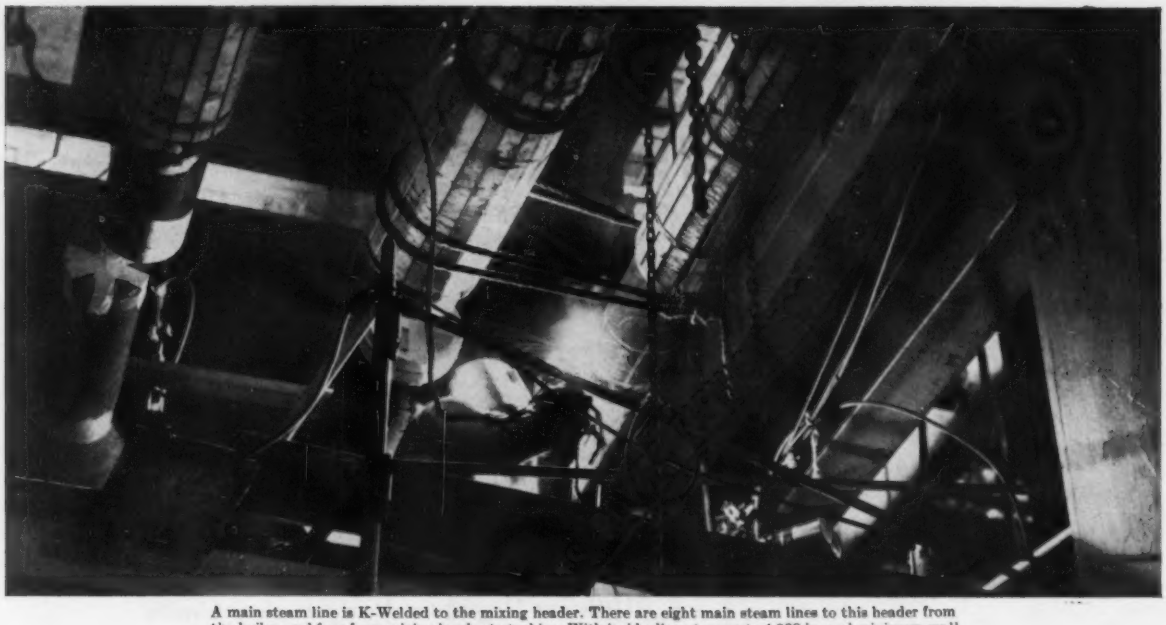
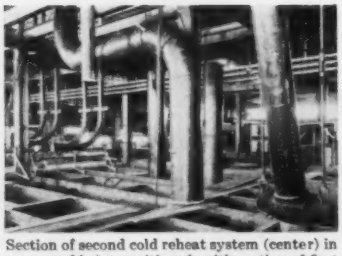
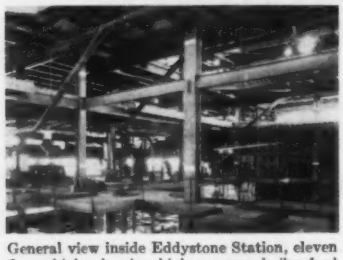


A main steam line is K-Welded to the mixing header. There are eight main steam lines to this header from the boiler, and four from mixing header to turbine. With inside diameters up to 4.938 in. and minimum wall thicknesses as much as 2.860 in., sections weigh four to five tons. Main steam header weighs over ten tons.

KELLOGG'S FIELD WELDING KEEPS PACE



Section of second cold reheat system (center) in process of being positioned, with section of first cold reheat system (right) partially in place. Four boiler feed risers at left.

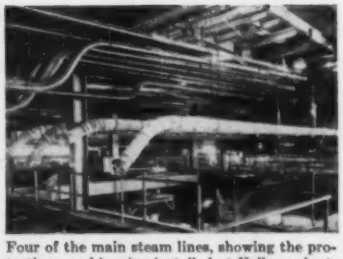


General view inside Eddystone Station, eleven floors high, showing high pressure boiler feed water risers (top and center) as these were being erected by Kellogg.

During erection of Philadelphia Electric Company's Eddystone Station, Unit No. 1, *eighty* K-Welds® . . . Kellogg's inert gas shielded technique of manual arc welding . . . will be made by Kellogg on the Type 316 stainless main steam lines alone. Following Kellogg's shop fabrication procedures on this job, every K-Weld will be given a total of *four* inspections by liquid penetrant and radiography during welding and after heat treatment.

Time required to finish and inspect each weld completely on this supercritical, heavy-walled piping is *eight to ten working days*. Further evidence of the magnitude and complexity of Kellogg's erection and welding assignment is provided by these construction photographs.

Kellogg welcomes inquiries on its complete service to the power piping industry from consulting engineers, engineers of power generating companies, and manufacturers of boilers, turbines, and allied equipment.



Four of the main steam lines, showing the protective wood lagging installed at Kellogg plant. This is not removed, except at welding points, until insulation is applied.

Six of the eight special high pressure valves being installed by Kellogg at the Eddystone Station—Philadelphia Electric Company's new supercritical steam power plant.

Fabricated Products Sales Division, THE M. W. KELLOGG COMPANY, 711 Third Avenue, New York 17, N. Y.

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POWER PIPING—THE VITAL LINK

® *Registered trademark of The M. W. Kellogg Company*

Why Promote Street Lighting?

Can you imagine an electric utility promoting street and highway lighting like major appliances, Medallion homes, or commercial cooking? If you know the industry very well, you probably can't. But, like the change in attitude toward electric space heating, there could be one in this field, too.

We just heard recently at the Electrical World Street and Highway Lighting Conference that two standard highway fixtures will provide the same annual revenue as a new home. And that a mile of lighting is equal to fifty homes. We also heard impressive things about what some utilities have been able to do in stimulating new street lighting, how such lighting stimulates other lighting in commercial and residential areas, and how valuable good street lighting can be as a public relations tool.

Our special report in this issue offers additional reasons why this exciting "new" load builder should be promoted.

Fischer Black

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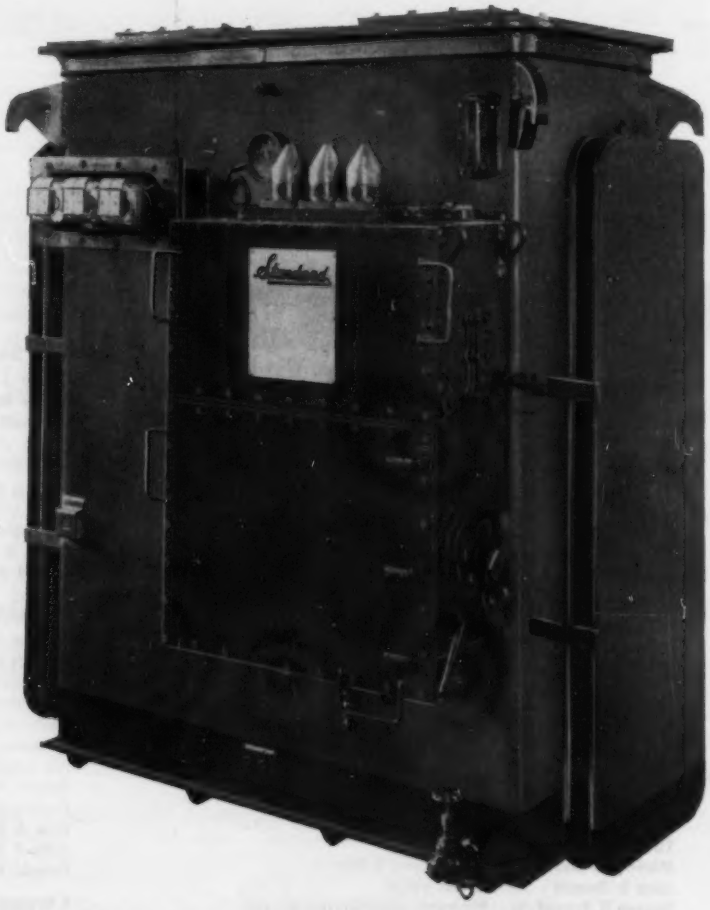
New!

LO-TEMP*

VAULT TYPE
NETWORK TRANSFORMERS

Six week delivery
Pancake type radiators
Components of your choice



This Standard Transformer Lo-Temp unit is three phase, 750 KVA, 14,400 volts primary and 480Y/277 volts secondary. It is a special, designed to go through a minimum sized opening. This unit costs no more than an off-the-shelf transformer, yet it was designed to the customer's specs, beats all requirements for sound level and temperature rise and it was delivered in just six weeks.

It doesn't cost a penny more to have your transformers designed by Standard to your specs. Check with your nearby representative or write to us. You'll get better transformers with longer life delivered in less time. Sound impossible? Prove it to your own satisfaction by getting the facts today. Ask your nearby Standard representative or write directly to us.

* LO-TEMP TRANSFORMERS PROVIDE EXTRA CAPACITY AT NO EXTRA COST.

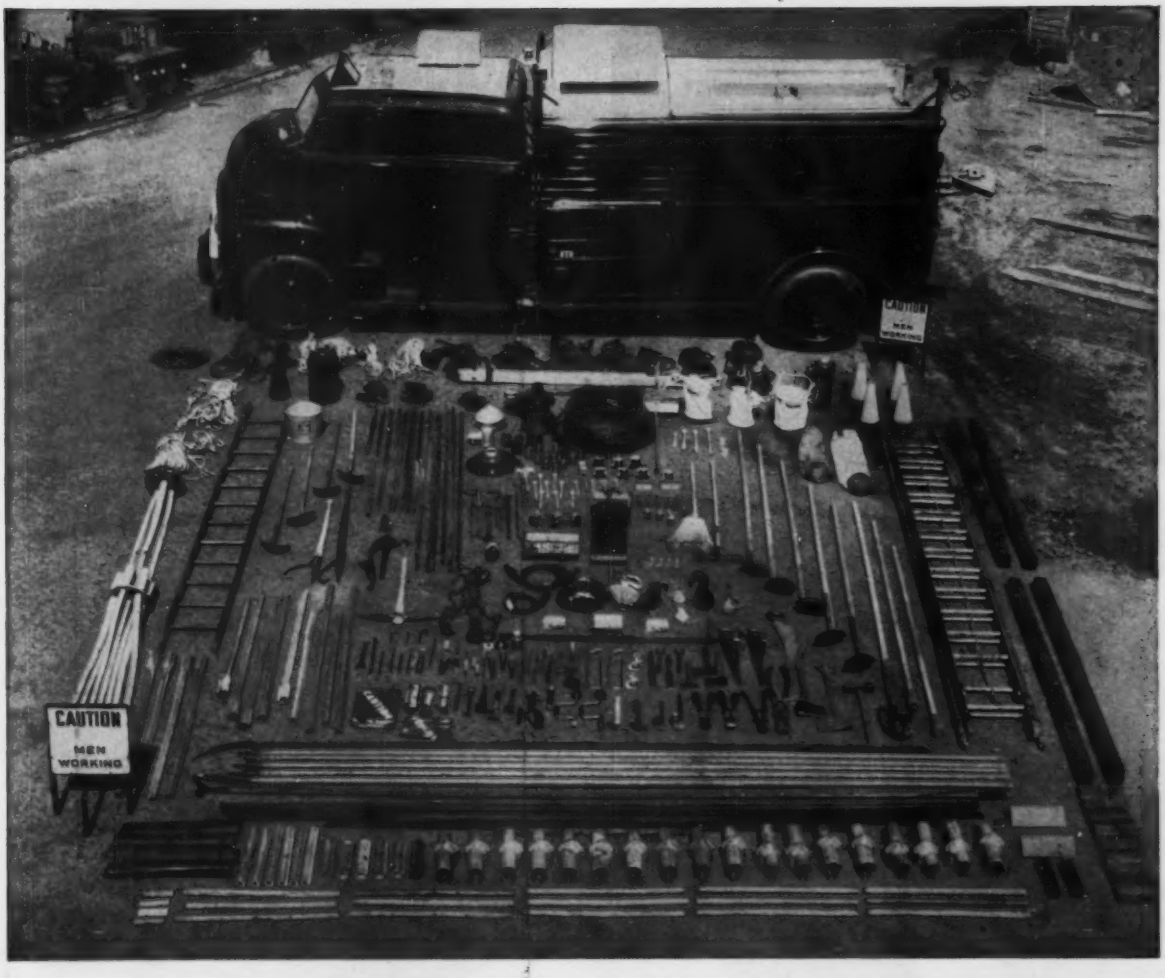
GIVE BETTER ELECTRICALITY

Phone Warren
2-1563

Standard Transformer CO.

WARREN, OHIO

"WHEREVER THERE IS POWER"



Look at your line truck equipment needs from this angle . . .

Here's a poles-eye view of a typical utility line truck showing the wide variety of construction and maintenance tools and safety equipment your linesmen need for most day-to-day jobs. But—without exception—each and every item shown can be ordered conveniently from your nearby Graybar office or warehouse . . . and in every case you get the type and quality needed to assure speed and efficiency on the job *plus* long years of satisfactory service. All are products your linesmen know and respect—products that have been tried, tested and proven in the field by scores of companies just like your own.

Remember, when you order "via Graybar", you save the time and expense of multiple inquiries, for you can select, from this single source, the items best suited to your needs from among the products of over 200 of the nation's leading manufacturers.

Graybar is thoroughly familiar with utility requirements. Further, your nearby Graybar Representative stands ready to help as a convenient source of information on everything needed for pole-line construction and maintenance. And should you be faced with an out-of-the-ordinary problem, call on the experience of a Graybar Outside Construction Specialist for a consultation. We'll welcome your inquiry!

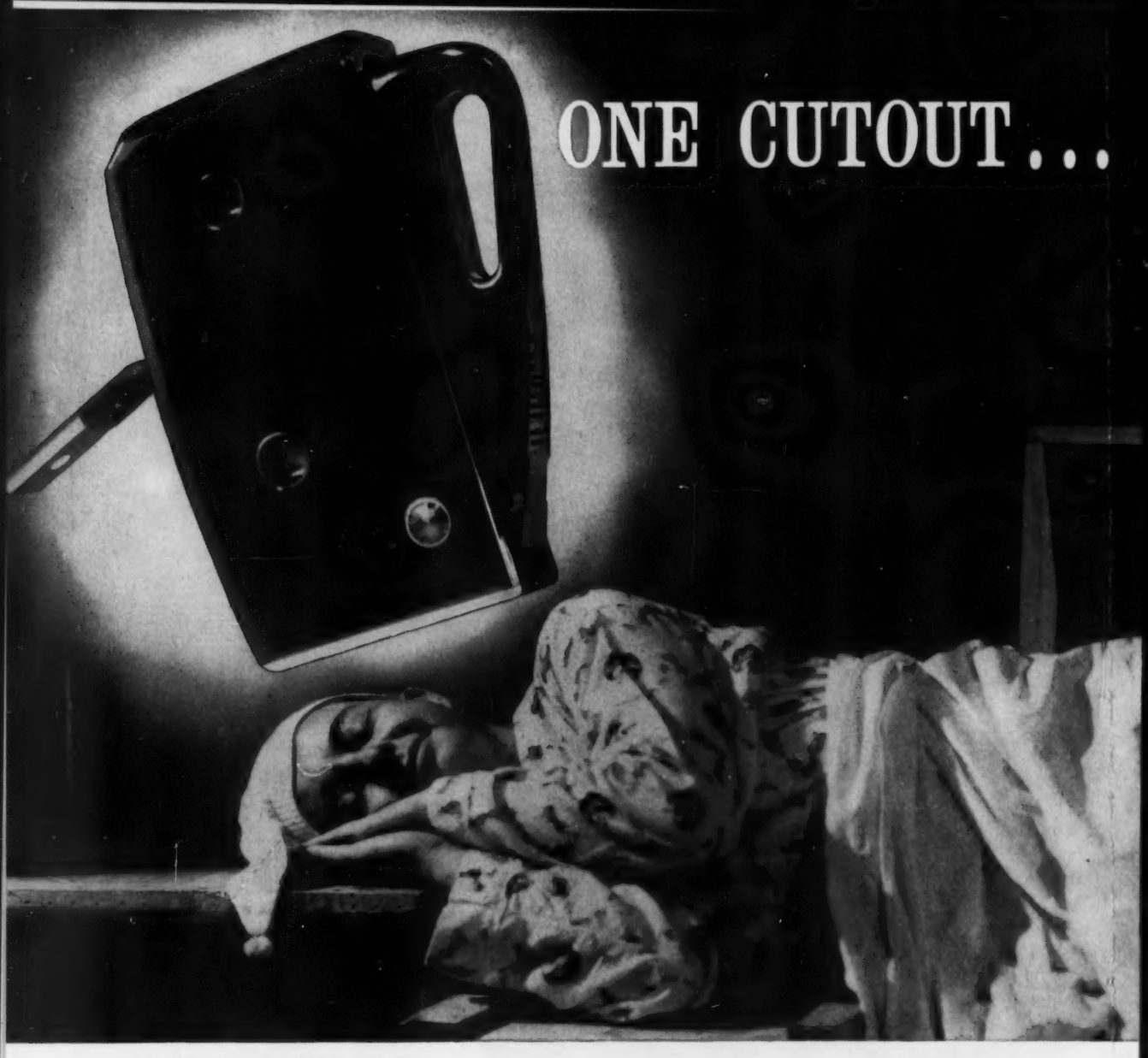
511

CALL GRAYBAR FIRST FOR . . .

GraybaR Everything Electrical

GraybaR ELECTRIC CO., INC.
420 Lexington Ave., New York 17, N. Y.

IN OVER 130 PRINCIPAL CITIES



Yesterday it was only a dream . . .

Today Westinghouse brings you an *all-purpose* cutout (**Type EU**) — *one* box and door to handle *all* your enclosed fuse cutout applications! No need to sleep in the warehouse, trying to keep up with the stocking needs for your system with four different boxes and twelve doors to match!

Think of the savings! Just one style box and door for all voltages — 2.6, 5.2, 7.8 kv — all currents up to 100 amperes continuous — with maximum interrupting capacities up to 14,000 amperes. The same cutout for dropout or non-dropout operation. It means simplified purchasing, smaller repair stocks . . . far easier maintenance.

No wild-eyed dream, this! We *know* Westinghouse universal cutouts will interrupt rated faults . . . over and over again. Beginning with carefully developed theoretical designs, we thoroughly proved their performance in grueling "controlled-fault" interruption tests at the Westinghouse High Power Lab. This is your assurance of full value for your protection investment.

A real value it is, too! Call your Westinghouse Sales Engineer today for complete details about this fabulous new cutout and its equally fabulous price. Or, write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pennsylvania. J-60966

TO REPLACE ALL OF THESE ?

Dropout or non-dropout with a twist of the wrist

By simply removing one screw, the new Westinghouse EU universal cutout can be converted from non-dropout to drop-out operation. The Moldarta* door is designed for easy manual closing or hook stick insertions.

*Trade-Mark

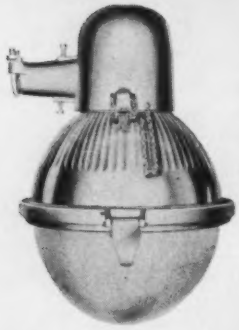
YOU CAN BE SURE...IF IT'S

Westinghouse

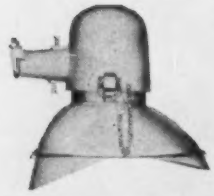
WATCH "WESTINGHOUSE LUCILLE BALL-DESI ARNAZ SHOWS" CBS TV MONDAYS

PEMCO'S ONE-PIECE NEMA STANDARD HEAD TOPS 'EM ALL

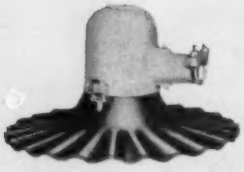
Pemco's one-piece head of special alloy high strength aluminum provides longer life—no joints with bolts to vibrate loose—no openings for moisture, dust or insects to enter.
Stainless steel "U" bolt and nuts assure snug fit on the mounting bracket. Available for internal wiring, with gland bushings, or with porcelain bushings with or without binding posts for external wiring.



Pemco one-piece head and specular finish alzak fluted reflector with hinged or wedge band, IES types I, II, III, IV and V distribution.



Pemco one-piece head and alzak suburban reflector, dichromate or aluminum finish.

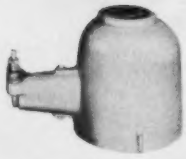


Pemco one-piece head and aluminum or porcelain enameled radial wave reflector.

Pemco one-piece head and Junior Reflector-Glassware Assembly with hinged or wedge band, IES types I, II, III, IV and V distribution. Junior heads available in both top and side entrance.

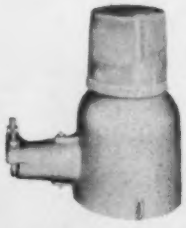
Pemco one-piece head and Fresnel Protective and Marine Luminaire. Also available with special adjustable bracket head for wall or wood pole mounting.

Pemco one-piece head with 1¼" aluminum plug for photoelectric control.



Pemco one-piece head with standard adapter with Hubbell twist lock socket for twist lock type photoelectric control.

Pemco one-piece head with 1¼" adapter type photoelectric control.



Pemco one-piece head with twist lock type photoelectric control.

Pemco standard one-piece side entrance or top entrance heads available with in-mounted transformer for 100 and 175 watt mercury lamps.

PEMCO PRODUCTS INCLUDE:

A complete line of Street Lighting Luminaires —
- Incandescent for series or multiple wiring,
- Mercury,
- Two-piece heads with long slip fitter and heat barrier,
- Top entrance heads — standard and junior.

Mounting Brackets and Poles.
Substation Luminaires.
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Gasoline Service Station Lighting.
Floodlighting.
Maintenance Parts.
Check your file — if you do not have the new 1958 Pemco Street and Highway Lighting Catalog request a copy today.

PEMCO LIGHTING IS QUALITY LIGHTING — SOUNDLY ENGINEERED, SKILLFULLY MANUFACTURED

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Engineering "KNOW HOW"

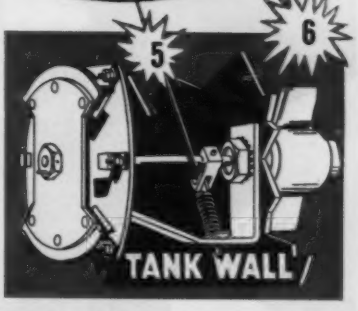
. . . A Basic Service For Meeting Customer Requirements

A Central customer recently requested a dual-voltage transformer for operation at 4340 or 7620 volts. Central engineers applied their expert knowledge of design to obtain the non-standard voltage ratio—WITHOUT SACRIFICING KVA OR LOSSES AT EITHER VOLTAGE. Central engineers went a step further and located the voltage change switch below oil level in such a position that an externally-operated knob on the side of the tank is easily accessible to the lineman.

Dual Voltage? Just Flip the Switch!

1. Assembly keyed to tank wall.
2. High conductivity copper contacts with wiping action.

3. Weatherproof Almag protective cap (serves as operating knob)
4. Switch position indication clearly visible.



5. Spring-loaded toggle-action.
6. Sturdy overall construction.

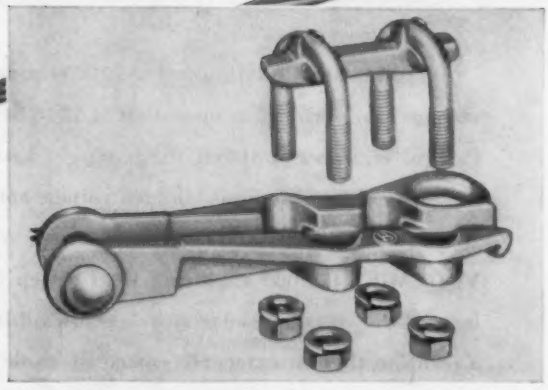
Just one more reason why Central Transformers are **PREFERRED** *throughout the Nation*

Central
TRANSFORMER CORPORATION

PINE BLUFF, ARKANSAS
Telephone JEfferson 4-5332
Sales Offices in Principal Cities

NEMA

"Deadends Go Up



O-B Strateline features captive keeper piece, has long thread sections on U-bolts. Six sizes cover conductor range of .15 to 1.55 inches in diameter.

Fast When We Use O-B Stratelines"

STREAMLINED DESIGN, CAPTIVE KEEPER PIECE INCREASE EFFICIENCY, MAKE LINEMAN'S LIFE EASIER

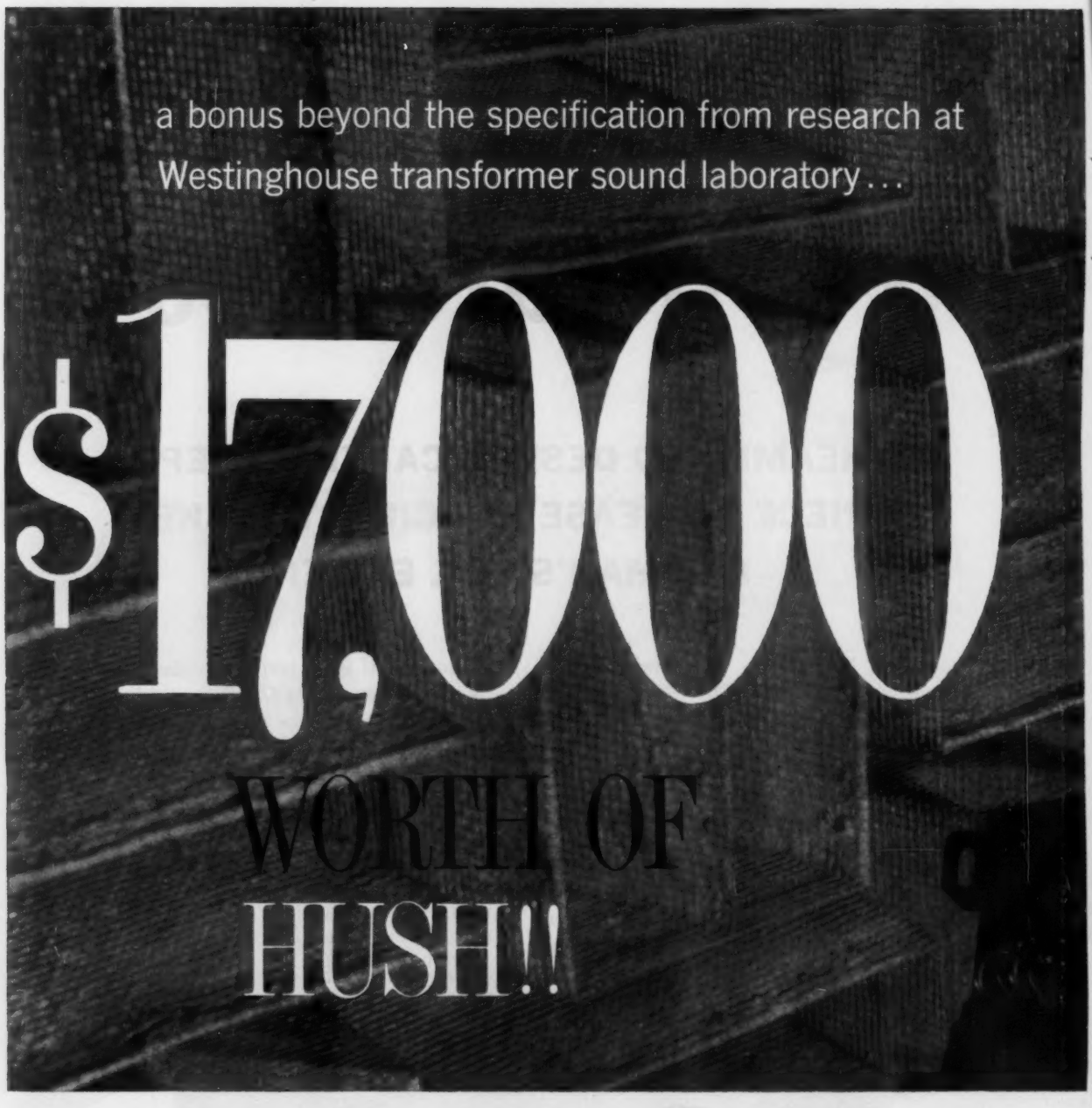
Want to get away from fumbling with loose parts? Are you interested in reduced line losses, and in a clamp that can be readily worked "hot" or "cold"?

Then the O-B aluminum Strateline Clamp is your answer. Made by the company that pioneered this streamlined design, the Strateline comes in six sizes, can be used on conductors ranging from .15 to 1.55 inches in diameter. The three smaller sizes overlap in conductor range, so that you can select the most economical clamp for your series of conductors. All sizes have the captive keeper piece. Long thread sections on U-Bolts permit the clamp to be loosened enough to insert the conductor without taking the nuts off.

Because it's aluminum, the Strateline reduces line losses, quickly paying for its extra cost (compared to magnetic materials) and eventually paying for itself. And because it's made by a company that knows both insulator and hardware problems, you can be sure it's built to perform effectively in your distribution system.

OHIO BRASS COMPANY, MANSFIELD, OHIO
Canadian Ohio Brass Co., Ltd., Niagara Falls, Ont.

4839-H



New reduced sound levels for Westinghouse power transformers eliminate price premiums for many installations

Announcing reductions of power transformer sound levels from one to nine decibels below NEMA levels, Westinghouse has again demonstrated its leadership in transformer development.

This means price premiums are eliminated for transformers built to these below-NEMA sound levels—saves up to $17,000 on original transformer cost (for a 400-mva FOA transformer).

These savings were made possible through earnings plowed back into research . . . for studying and developing better means of reducing sound levels at the source—better design, new and improved methods and materials.

The major Westinghouse facility for researching sound is the vast anechoic chamber at Sharon. This laboratory—together with other high-power test equipment in Sharon's test center—permitted Westinghouse engineers to investigate sound control thoroughly . . . to evaluate sound dampeners . . . to evaluate barriers and complete enclosures . . . and to evaluate their efforts for reducing noise at its source, the transformer core.

From these test facilities came new reduced sound

levels—the result of improved materials and processing—modifications to steel formulations, handling techniques and core building combinations. The effect of each change was isolated in the sound lab, and its value thoroughly proved.

Shown here are typical examples of potential savings in transformer cost through the new reduced sound levels. Ask your Westinghouse representative about savings for your specific transformer application . . . another example of the real benefits produced through Westinghouse research—from earnings reinvested in the study of electric utility industry problems.

J-70811

Typical Transformer Example	Recommended NEMA Sound Level in db	Westinghouse Sound Level in db	Reduction Guaranteed Sound Level in db	Percent Saving in Original Equipment Cost	Potential Dollar Saving on Original Cost
5000 kva Type OA 350 kv BIL or lower	67	65	2	12%	$ 3,800
10,000/12,500 kva Type OA/FA 350 kv BIL or lower	74	70	4	12%	$ 6,600
30/40/50 mva Type OA/FO/FOA 550 kv BIL	82	78	4	2%	$ 3,300
400 mva Type FOA 900 kv BIL	96	89	7	2%	$17,000

YOU CAN BE SURE...IF IT'S **Westinghouse**

WATCH "WESTINGHOUSE LUCILLE BALL-DESI ARNAZ SHOWS" CBS TV MONDAYS

NOW there's a new standard of toughness for plastic wire and cable insulation!

A new type of polyethylene plastic has been developed, which when used as cable insulation provides the excellent electrical properties of regular polyethylene, plus a toughness and abrasion resistance superior to almost any other plastic or rubber.

Hercules makes this new high density polyethylene, under the trade name Hi-fax, in a special grade designed for use in wire and cable. It is now available in tree wire, where a one-shot insulation of Hi-fax outperforms other types of heavy duty tree wire made with a protective sheath of nylon or varnish impregnated braid. Hi-fax serves equally well in service drop cable and insulated aerial cable, where outstanding abrasion resistance and mechanical cut-through resistance are needed.

Hi-fax cable can cut your installation and maintenance costs, and, at the same time, improve your power distribution system. Contact your present cable supplier for further information.

HOW HI-FAX COMPARES WITH OTHER INSULATIONS

	Hi-fax High Density Polyethylene	Conventional Polyethylene	Neoprene	PVC
Abrasion resistance	excellent	good	fair	good
Chemical resistance	excellent	very good	very good	very good
Cold bend	very good	very good	very good	fair
Corona resistance	fair	fair	poor	excellent
Dielectric strength	excellent	excellent	good	excellent
Environmental stress cracking	good	marginal	---	excellent
Flame resistance	poor	poor	very good	very good
Heat distortion temperature	good	poor	very good	good
Heat softening point	good	poor	very good	good
Insulation resistance	excellent	excellent	poor	good
Moisture resistance	excellent	excellent	fair	excellent
Oil resistance	excellent	good	excellent	good
Ozone resistance	very good	very good	good	excellent
Power factor	excellent	excellent	poor	poor
S I C	excellent	excellent	poor	fair

Hercules Powder Company does not manufacture insulated wire and cable, but supplies Hi-fax high density polyethylene in resin form to wire and cable producers.

Hi-fax is so tough, it's hard to strip by conventional methods, but this special tool makes it easy to do the job:

CP58-5

Cellulose Products Department

HERCULES POWDER COMPANY

INCORPORATED

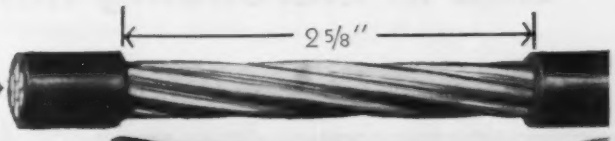
900 Market Street, Wilmington 99, Delaware

Even the HARDEST*

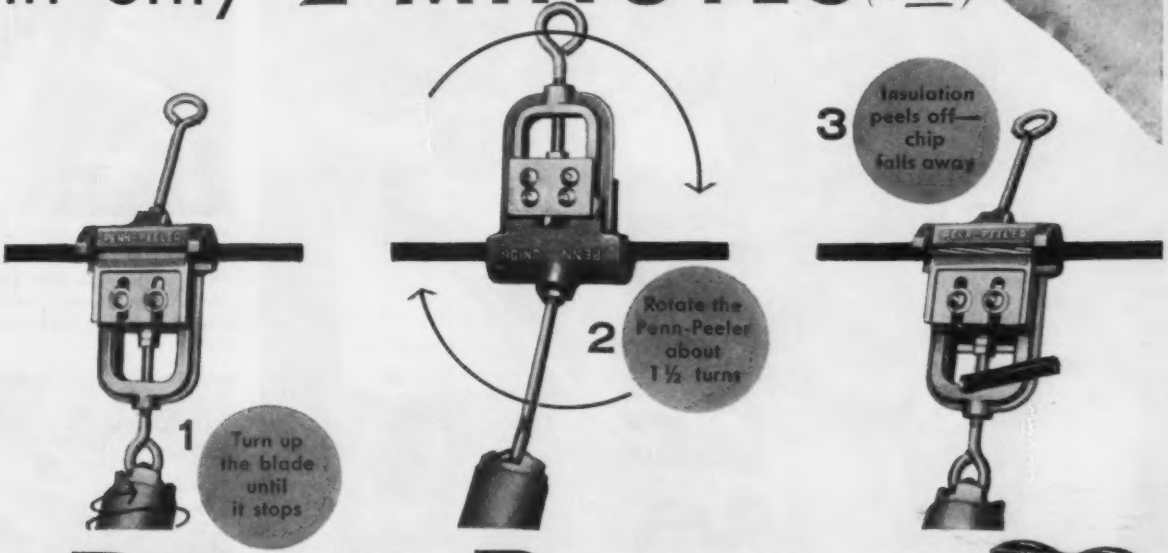
Insulation →

*high density (linear) polyethylene

stripped for tap →



in only 2 MINUTES (or less)



PENN-PEELER

TYPE TPP-1 PATENT PENDING

NO NICKS or scratches on the conductor.

PEELS OFF INSULATION quickly and easily—even in the coldest weather: Hardest tree wire, rubber, neoprene, PVC, etc. Ends and long lengths as well as mid-span cuts.

HOT OR COLD TAPS are made with equal safety, in any location. Can be furnished with handle instead of eye.

STRIPS 134 COMBINATIONS of cable size and insulation thickness with interchangeable blades: Conductors 2 str. to 4/0 ACSR; insulation 3/64" to 12/64" thick.

SEE IT—TRY IT YOURSELF. You are invited to have a demonstration of the Penn-Peeler; just write or phone Penn-Union Electric Corp., Erie, Pa. Phone 45-261, Exten. 101. *30th year of service to the Electrical Industry.*

Reinforced plastic carrying case for Penn-Peeler & blades

There's a **NEW** and **BETTER** way at **PENN-UNION**

Federal Pacific Metal-Clad Switchgear is made compact...rugged... and in increasing numbers!

Federal Pacific Metal-Clad Switchgear does the job—it's proven by the growing list of installations across the United States and abroad. Most important, Federal Pacific does it with stronger materials, fewer parts, most modern design, and complete safety to operating personnel.

It's rugged...it's safe...it's easy to maintain...it's accepted!

For the full Federal Pacific Metal-Clad Switchgear story call your Federal Pacific engineer or write for Catalog No. 3-440, Federal Pacific Electric Company, Newark, New Jersey.

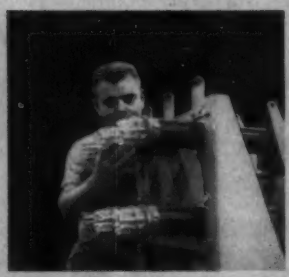
FEDERAL PACIFIC

METAL-CLAD SWITCHGEAR

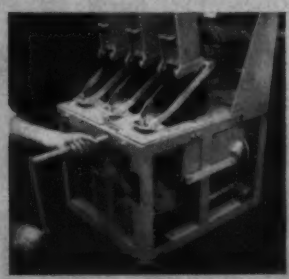
OFFERS UTILITIES

THESE SPECIFIC ADVANTAGES:

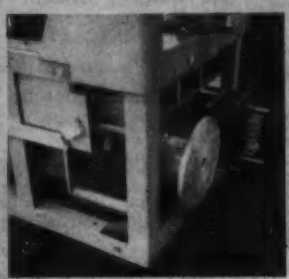
• **BREAKER MECHANISM IS COMPLETELY SELF-CONTAINED**—Attached to frame by *only four bolts*. No bearings or shafts are in contact with frame. Breaker mechanism can be removed for inspection and maintenance as a unit—simply and quickly.



• **PRIMARY DISCONNECTS ASSEMBLY MOUNTS ON BREAKER AS A UNIT**—Complete six stud bushing sub-assembly mounted directly on breaker facilitates inspection and service.



• **SIMPLE RACKING-IN MECHANISM**—Only two moving parts...provides positive safety inter-locking in any position.



• **CLOSING SOLENOID MAINTAINS TORQUE TO END OF STROKE**—Plunger disc gives solenoid additional pull at the end of the stroke when most needed...to compress closing springs and make positive contact.

FEDERAL PACIFIC

The Best in Electrical Distribution and Control Equipment

The Electrical Week

FUTURE NEWS ▶ **Watch for an intensive gas industry national promotion program** aimed at capturing the home range market. Called the "Gold Star Range Program," it was outlined at AGA's annual convention.

LATE NEWS ▶ **Nuclear news** . . . Dr Frank K. Pittman is taking over as director of AEC's Division of Reactor Development. Pittman, who has been Director of Industrial Development, succeeds Kenneth Davis, resigned . . . AEC Chairman John McCone announces merger of Divisions of Reactor Development and Industrial Development . . . Allis-Chalmers gets license to build 100-w experimental reactor for use in building power reactor for Northern States Power Co.

Westinghouse sales billed for first nine months of 1958 is $1,384,499,000—6.3% under the $1,477,273,000 billed for the same period in '57. However, net income was $49,011,000, only 0.2% under 1957's $49,102,000.

American Electric Power wins Silver Award from Financial World for best '57 annual report in the public utility field. American & Foreign Power gets award for best among Latin American companies.

Interior Secretary Seaton urges a halt on Army dams. In a letter to Army Secretary Bruckner, he calls for a stoppage to the planning and recommendation of any more dams by the Corps of Engineers on the Middle Snake River.

Management changes . . . Duke Power elects W. B. McGuire president, succeeding N. A. Cocke, who retires Jan. 1 . . . L. S. Pricher becomes vp-finance of Foster-Wheeler Corp.

Obituary . . . Paul D. Brooks, 53, commercial vp, American Electric Power, died Oct. 23 at Englewood, N. J.

POWER OUTPUT—UP 3.3% (Week ending Oct. 25), Kwhr 12,174,000,000

Per Cent Change From Previous Year

	Oct. 11	Oct. 18	Oct. 25
Total U. S. ...	+3.1	+3.1	+3.3
New Eng. ...	+4.7	+2.2	+5.3
Mid. Atlantic..	+2.0	+2.8	+3.1
Cent. Ind.	+1.6	−0.3	+0.2
West Cent. ...	+4.1	+1.8	+1.8
Southeast	+3.0	+3.5	+1.9
South Cent. ...	+9.4	+7.6	+11.9
Rocky Mount..	+2.4	+9.0	+9.7
Pacific			
NW	−2.4	−1.0	+1.6
SW	+6.5	+11.8	+7.7

Seasonally Adjusted Index 237.4

Week Ago 236.1 Year Ago 229.6

Source: Edison Electric Institute

A TWO-MINUTE PREVIEW OF THIS ISSUE

EVENTS ▶ **AEC Chairman John McCone chided "some companies"** for not taking the initiative in A-power technology. He discounted the higher nuclear power costs as a reason for power company sluggishness in getting into nuclear power development. Said McCone: "Any group which can look down the road and see higher conventional fuel costs ahead should start now with a nuclear program." For this and other McCone comments in an exclusive EW interview, see p 44.

A "model" plan for quick rate relief is in the works in Washington, D. C. If enacted it would enable commissions to grant a partial rate hike—subject to a refund—if a summary investigation revealed need. One requisite would be a legislative definition of rate base (p 45).

New reactor concepts recently announced by Westinghouse include an organic moderated fluid bed reactor requiring no control rods and a method of converting heat produced in a reactor directly into electricity without an intervening steam cycle (p 46).

Modernize industrial plants and street lighting. The fifth and last of Electrical World's special reports urges utilities to do two things: (1) Discharge their obligations to their industrial customers by helping them increase productivity and efficiency by using more kilowatthours; and (2) Streamline their street and highway lighting to improve community relations and at the same time increase their return on investment from it (p 51).

INDUSTRIAL—I ▶ **Utility training programs for industrial customer personnel** are one of the high points in meeting community modernization problems that are essentially educational in nature. Utilities have launched and supported these large scale programs to make industrial managerial and technical people aware of the potential efficiency and productivity gains to be had through the use of modern methods. Among the rapidly growing roster of training programs are courses in industrial lighting, heating, air conditioning, electrical maintenance, distribution design and automation (pps 52-54).

The individual power salesman's efforts must also grow. Today, this highly trained specialist functions as a consulting engineer as well as salesman to his industrial customers, often spends as much time "servicing" his accounts as selling them (p 56).

Results of the utility effort speak for themselves. Training programs and consultation are paying off, and will continue to do so, in modern, competitive production (p 58).

STREET LIGHTING—II ▶ **Report on EW's Street and Highway Lighting Conference**—The need to upgrade, modernize, streamline—these terms came up again and again at the Street and Highway Lighting Conference last month in

Chicago. Speakers generally agreed that utilities face a two-pronged problem. They must simultaneously improve the street and highway lighting systems they serve to better their community relations, and at the same time, they must put S&H lighting on a more realistic return-on-investment basis (p 60).

Report on EW's Street and Highway Lighting Survey—Conducted among 119 utilities to measure management's attitudes toward street and highway lighting, the survey pegs the utility street and highway lighting situation with respect to organization, rates, revenues, markets, equipment standardization and wants (p 62).

MANAGEMENT ▶ **California PUC was urged to compel utilities** to adopt liberalized depreciation, with all benefits to be passed on to the ratepayers. Chief advocate of this proposal is California Attorney General Edmund G. Brown, Democratic candidate for the governorship. Other witnesses joined in the attack on the principle of normalization of tax deferrals available under Sections 167 and 168 of the Internal Revenue Code of 1954. Their arguments are analyzed on p 95.

SELLING ▶ **Con Edison is pushing kitchen modernization** with its new kitchen planning center. A Polaroid camera takes a picture of a scale model of the customer's dream kitchen (p 105) . . . Two conferences probe female mind on new appliances and electrical living (p 109).

MANUFACTURERS ▶ **GE introduces bushing line, featuring interchangeability** between transformers and circuit breakers in the standard voltage classes from 23 to 196 kv (p 70) . . . Allis-Chalmers is building a transformer which will have an equivalent two-winding capacity of 404,250 kva (p 70) . . . Sherman & Reilly, Inc, is using machine which tests Neoprene linings in conductor stringing sheaves (p 74) . . . Electrical manufacturing industry in Canada passed the billion-dollar mark in production in 1957 (p 74).

NEW EQUIPMENT ▶ **Substation transformer has standardized design core form.** Internal rather than external tank bracing, gives a streamlined appearance . . . Circuit breaker for sub-transmission applications features single-tank construction and 5-cycle operating time . . . Small bore cutout is rated extra heavy duty (10,000 amp at 5.2 and 7.8 kv, and 8,000 amp at 15 kv) (p 86).

PEOPLE ▶ **British Columbia Electric** has named Jack H. Steede, chief engineer, electrical division, and John J. Garson, director of industrial relations, new vice presidents . . . Hartley Rowe has been named chairman of the board and Oscar S. Bray, president, of the new subsidiary of Jackson & Moreland, Inc . . . Coolerator Division, McGraw-Edison has made William G. Kronauge vice president. Penn-Union named Lester R. Crane sales manager (p 113).

Successful leaders are idea men, team builders, helpful to subordinates, enthusiastic about their work, courageous, and willing to take on responsibility—**J. E. Phelan, Electrical West, Sept 1958.**

TECHNICAL NOTES

High-pressure boilers inherently have less storage capacity and are more responsive to changing conditions. High temperature, on the other hand, demands that variations be kept to a minimum to prolong the life of the equipment.

Using steam turbine drives for forced-draft fans on pressure-fired steam generators may be economical. Variable-speed turbines for these drives allow the use of higher speeds for the fan's design and overload conditions while retaining a conservative normal operating speed.

A power transmission line using direct-current voltage is inherently a nonsynchronous tie.

Small internal temperature changes cause larger pressure variations than leaks in a carefully fabricated pressure vessel. This is an important consideration in testing large containment vessels for nuclear power plants.

Two circuit windings instead of one will probably be used on steam-turbine generators as size increases, according to some designers.

Growing inclination to ignore broken wire assumptions in transmission tower design is resulting in weight reductions of 25% and cost reductions of 10%.

FROM EDITORS IN THE FIELD

Completely transistorized public address system will be used at Eddystone plant of Philadelphia Electric Co. Components will pick up their power supply from adjacent lighting circuits. Lower installation costs offset increased cost of components.

North and south business sections of Mishawaka, Ind., are lighted by 94 L-M V-type fluorescent units (188 luminaires), mounted on 30-foot aluminum poles which are staggered at 70-foot spacing. Each of the two 4-foot luminaires in the V has two 100-watt lamps, providing approximately 24,000 lumens per pole. Units were supplied by Englewood Electric Supply of South Bend. Installation was by the Mishawaka Electric Department under the direction of Superintendent Austin R. Klien, with the cooperation of L-M's Field Engineer C. W. Puent. Note the even, diffused lighting.

L-M V-Type Fluorescents Turn Night Into Day At Mishawaka

The L-M V-type luminaires used in Mishawaka and many other cities in the country are an outstanding development in outdoor lighting equipment. These V-type units consist of two luminaires mounted at a 45-degree angle to each other. Each luminaire contains two 4-foot 100-watt fluorescent lamps. This gives maximum utilization of the light output.

The design of the luminaires, plus the 30-foot mounting height and 70-foot staggered spacing, results in exceptionally even light distribution.

Referring to the installation, Mayor Albert L. Doyle said: "The installation of our revolutionary fluorescent lighting system is heralded by enthusiastic and universal acclaim by all of our citizens and, most particularly, by our merchants, who honestly feel that a long-awaited improvement has been most satisfactorily completed."

What Do You Want To Light?

Tell us your problem; L-M lighting engineers will help you solve it—whether it's a street, a parking area, a subdivision, or an airport. L-M makes equipment for all, and L-M engineers will design the system you need, and provide complete plans and a bill of materials. For information and bulletins, ask the L-M Field Engineer or Lighting Engineer in your area; or write Lighting Division, Line Material Industries, Milwaukee 1, Wisconsin. In Canada: Canadian Line Materials, Ltd., Toronto 13, Ontario.

V-type fluorescent

Shallow design, for wide spread

Deep design, for more concentrated light

Delta type, for parking areas, shopping centers

Floodlight type, for parallel lighting

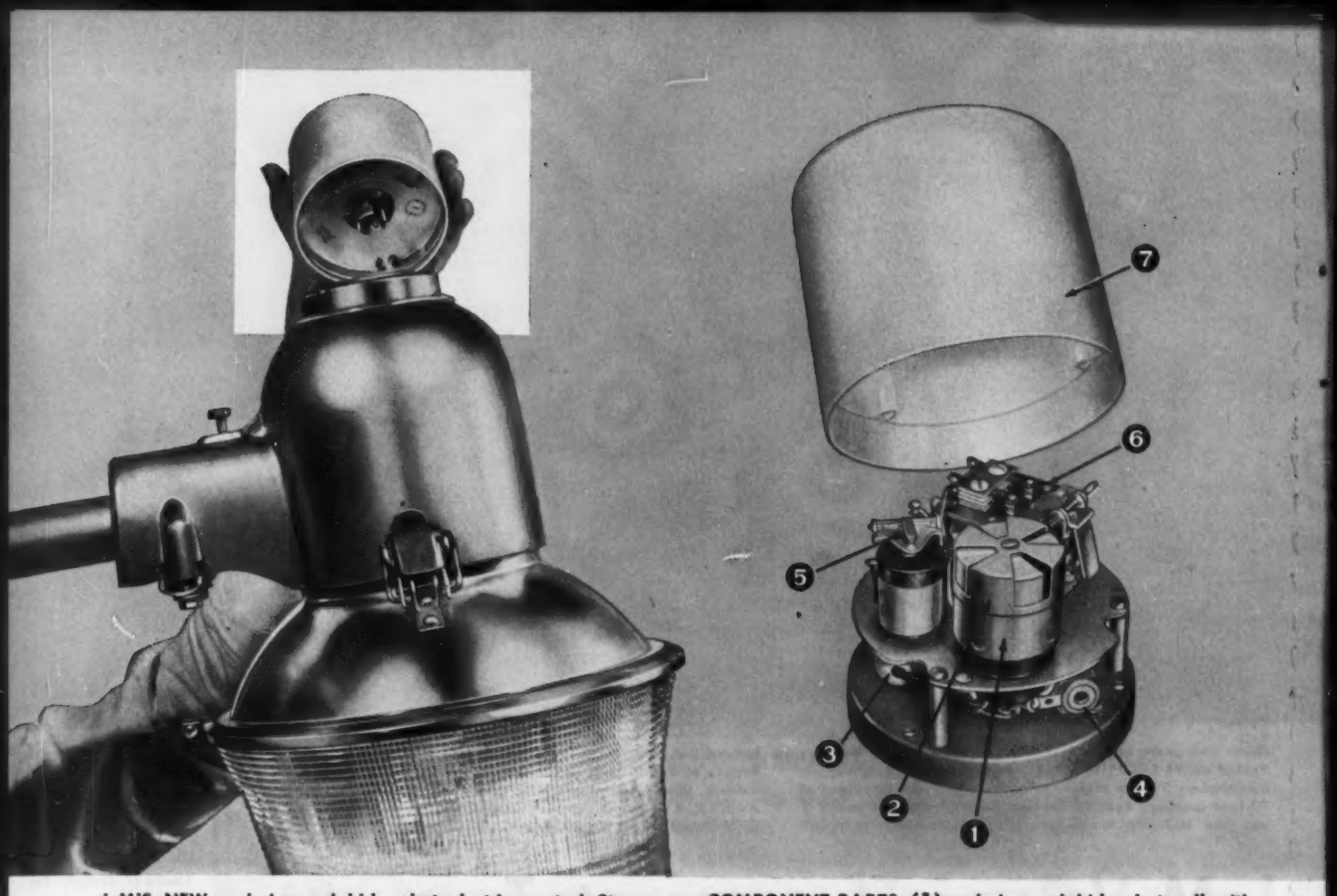
376

LINE MATERIAL Industries

McGRAW-EDISON COMPANY

Outdoor Lighting

McGRAW EDISON



L-M'S NEW cadmium-sulphide photoelectric control fits standard EEI-NEMA heads with Twist Lock® receptacle or adapter available for straight prong sockets. Reliable research reports indicate that hermetically sealed cell assures long life—with contact life of 15 years or more. Factory setting 1 to 1½ footcandles; adjustable from ½ to 6 footcandles.

COMPONENT PARTS: (1) cadmium-sulphide photocell with broad active surface; (2) adjustable louver; (3) capacitor; (4) selenium rectifier—improves pilot relay action; (5) pilot relay, d-c type; (6) load relay with non-integrating time delay; (7) Tenite® II plastic housing, 4 x 4 inches. Other components, not visible, are resistor; lightning arrester, 3-prong locking-type plug—holds control firmly on head.

New L-M Tubeless Cadmium-Sulphide Photo Control—Dependable, Economical

Conservative operation of all components, and even light distribution over photocell's active surface, provide maximum life, trouble-free service.

L-M announces a new tubeless photoelectric control for incandescent, fluorescent, and mercury vapor outdoor lighting. The new unit, built by Tabet, achieves long life and reliable, economical operation by effective use of a new cadmium-sulphide photocell connected directly to a d-c pilot relay. The cell provides enough current to operate the relay with as little as one-half footcandle, without amplifying tubes or transistors.

The photoconductive-type photocell has a broad active surface and is hermetically sealed for stability. A unique adjustable louver spreads the light evenly over the entire active surface of the cell to insure long unit life. The plastic housing provides additional diffusion. The result is a control that is so economical, and requires so little maintenance, that it is practical to use a control on each luminaire.

Built-in Time Delay

The new Cd-S control uses magnetic pilot and load relays. The load relay provides positive non-integrating 5-second time delay, which eliminates transient operation by lightning flashes or traffic. Contacts are rated 1000 watts. The pilot relay is a time-proved d-c type which operates on low current.

Get Details From L-M

Ask the L-M field engineer or lighting engineer for more information on the many advantages of these new L-M cadmium-sulphide photoelectric controls. Or write for bulletin to Line Material Industries, Lighting Division, Milwaukee 1, Wisconsin. In Canada: Canadian Line Materials, Ltd., Toronto 13, Ontario.

LINE MATERIAL Industries Outdoor Lighting

McGRAW-EDISON COMPANY

DISTRIBUTION TRANSFORMERS • KYLE RECLOSERS AND OIL SWITCHES • FUSE CUTOUTS AND FUSE LINKS • LIGHTNING ARRESTERS
POWER SWITCHING EQUIPMENT • PACKAGED SUBSTATIONS • CAPACITORS • REGULATORS • OUTDOOR LIGHTING
LINE CONSTRUCTION MATERIALS • PORCELAIN INSULATORS • FIBRE PIPE AND CONDUIT

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McGRAW EDISON

VIEW OF DAKOTA AVENUE, WAHPETON, N. D., shows the attractive daytime appearance of L-M's shallow-globe fluorescent luminaires. Mounting height is 28 feet, with Union Metal davit-type poles opposite each other at 100-foot intervals. This provides 1.2 footcandles of even, glare-free light. Installation by Hintgen-Karst Electric Company of Wahpeton.

Wahpeton Selects L-M Fluorescents for Complete New Street Lighting System

With cooperation of Otter Tail Power Company, Wahpeton's Street Committee makes thorough study and comparative analysis of various makes of luminaires for lighting business streets and neighborhoods.

More than 130 new L-M fluorescent lights illuminate the business section and side streets of Wahpeton, N. D., with ample soft, glare-free light. The installation, recently completed, replaced a 20-year-old incandescent system.

In a thorough study by the city, the power company made sample installations of a number of makes of luminaires for comparisons of appearance, effectiveness, maintenance and costs. The L-M shallow-type 6-foot units selected are equipped with two 150-watt (25 watts per foot) lamps that provide about 18,600 lumens per luminaire. This results in a maintained level of illumination on the street of 1.2 footcandles on Dakota Avenue, and 0.75 footcandles on side streets.

For complete information on L-M's complete line of outdoor lighting equipment and lighting application engineering, ask the L-M Field Engineer, or phone or write Line Material Industries, Lighting Division, Milwaukee 1, Wis. In Canada, Canadian Line Materials, Ltd., Toronto 13, Ont.

McGRAW EDISON

359-R

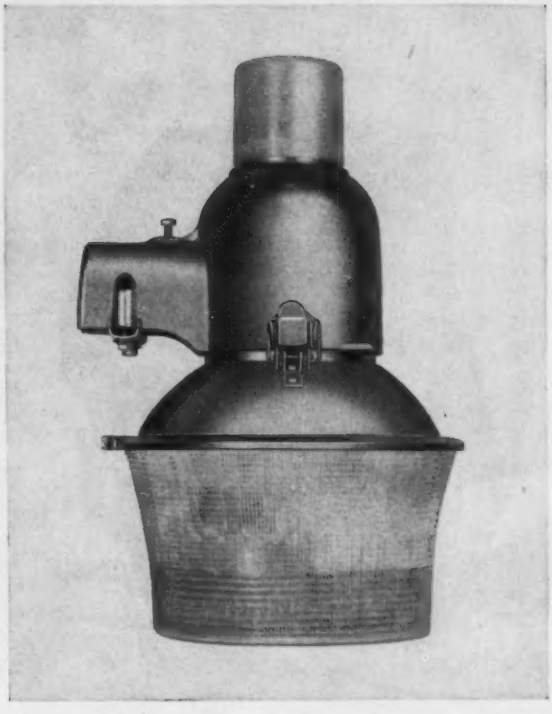
LINE MATERIAL Industries
McGRAW-EDISON COMPANY

Outdoor Lighting

DISTRIBUTION TRANSFORMERS • KYLE RECLOSERS AND OIL SWITCHES • FUSE CUTOUTS AND FUSE LINKS • LIGHTNING ARRESTERS • POWER SWITCHING EQUIPMENT
PACKAGED SUBSTATIONS • CAPACITORS • REGULATORS • OUTDOOR LIGHTING • LINE CONSTRUCTION MATERIALS • PORCELAIN INSULATORS • FIBRE PIPE AND CONDUIT

L-M Suburbanaire Gives Protection, Adds Off-Peak Load

Utilities rent customers this photocell-controlled luminaire at about $3 a month; it provides all-night lighting for security and recreation; increases revenue for the utility. Open-type refractor keeps maintenance at minimum.



A number of utility companies have had excellent results with a new plan for individual outdoor lighting for customers. Here, briefly, is the plan:

- The utility installs the L-M Suburbanaire on the customer's premises without charge. The Suburbanaire is an open-type, low-cost luminaire with built-in photocell control, thus providing all-night yard lighting.
- The utility maintains the unit and keeps it in operation.
- The utility provides power which does not go through the customer's meter.
- Cost to the customer is a stated amount per month—usually $3 or $3.50—which covers all costs. The utility retains ownership of the luminaire.

Customers like the plan, because it safeguards property, cuts vandalism and theft, reduces accidents, and has some prestige value, particularly in areas where there is no street lighting.

From the utility standpoint, the plan increases revenue in off-peak hours. Here is what some utility men say:

"We have installed more than 200 L-M rural lights, increased our off-peak load by more than 50 kw, and have had many expressions of complete satisfaction from our customers."

"The Photocell Suburbanaire assures us of an off-peak load of about 1000 kw hours per unit. We have installed almost 400 Suburbanaire luminaires, many of these replacing the old makeshift radial fixture arrangement. Customer reaction has been excellent . . . equipment and gasoline theft has dropped substantially and vandalism is almost nil."

"From time to time, customers have asked us for outdoor lighting for rural and suburban homes. Since January, 1957, we have been installing L-M's new Suburbanaire unit. The long-life lamp and photo-electric cell, plus ease in relamping and cleaning the open refractor, will keep our maintenance costs at a very low minimum. This makes it possible to offer this service at a very low cost."

TYPICAL ANALYSIS OF COSTS

Material:	
Suburbanaire, photocell, bracket, etc.	$ 70.00
Installation labor	30.00
Annual power cost (based on 300 watt lamp burning 4000 hrs. per year @ 1¢ kwh)	12.00
Lamp replacement, maintenance	9.00
Total Cost First Year	**$ 121.00**
Outdoor lighting equipment is built to last 20 to 25 years, but if this equipment is amortized over 10 years, the cost will be:	
First-year cost (above)	$121.00
Nine times power and maintenance cost (9 more years) 9 x ($12 + $9)	189.00
10-year total	$310.00
Interest at 6%	18.60
Profit, at 10% on $328.60	32.86
Total 10-Year Cost Plus Profit	**$ 361.46**
Annual cost (1/10th)	$ 36.15
Cost per month (1/12th)	$ 3.01

Get The Whole Story

Ask the L-M Field Engineer for bulletin on the L-M Suburbanaire luminaire and more information on the profitable customer-rental plan. Or write Line Material Industries, Milwaukee 1, Wisconsin. In Canada: Canadian Line Materials, Ltd., Toronto 13, Ontario.

McGRAW EDISON

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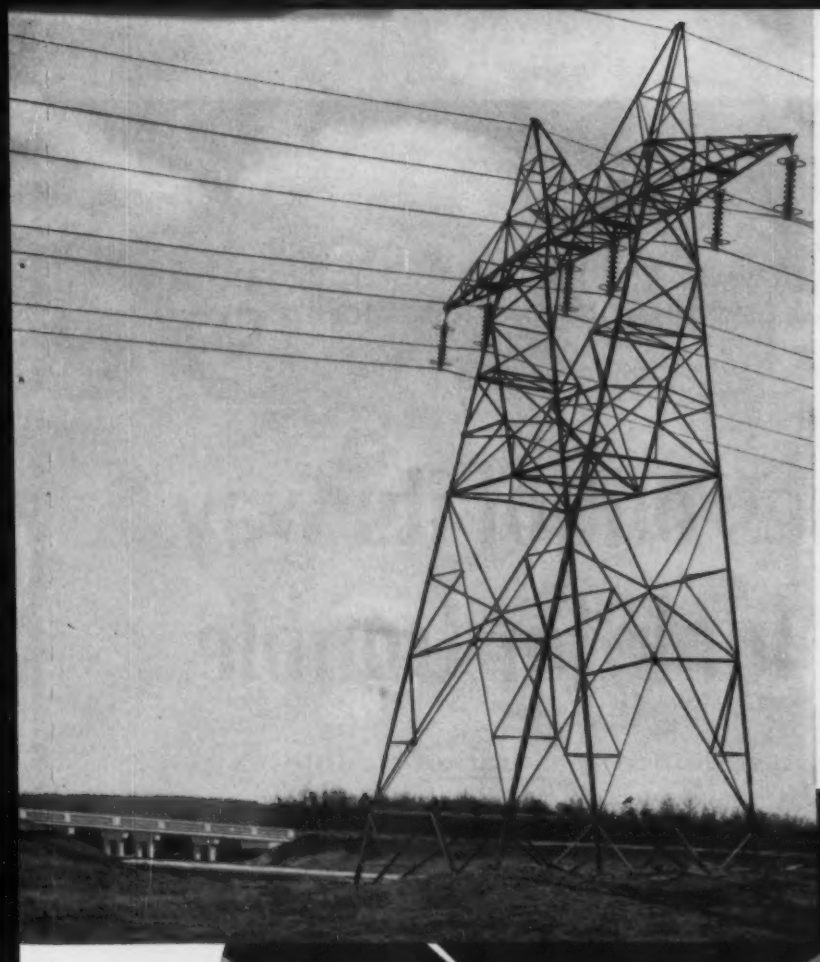
LINE MATERIAL Industries Outdoor Lighting

McGRAW-EDISON COMPANY



One of ten Blaw-Knox Double Circuit towers supporting the recently relocated section of Western Massachusetts Electric Company's 115,000 volt line between Chicopee and East Springfield.

Indian Orchard Interchange (No. 6) serving the city of Springfield on the new 123 mile linking of Boston and the New York State line.

BLAW-KNOX TOWERS support line relocation for new turnpike interchange

Plans for the newly opened 239 million dollar Massachusetts Turnpike made it necessary for Western Massachusetts Electric Company to relocate a 1.2 mile section of their Agawam East Springfield C3 line.

To permit construction of the Springfield interchange, ten double circuit towers, like the one shown above, were engineered and fabricated by Blaw-Knox in cooperation with the utility's own engineers.

For over 40 years, Blaw-Knox has worked closely with electric utilities to furnish towers for every type of transmission system. If you have a tower problem, we'd like to work with you. Send today for Folder 2509 . . . or tell us your requirements and we'll give you our recommendations and a quotation.

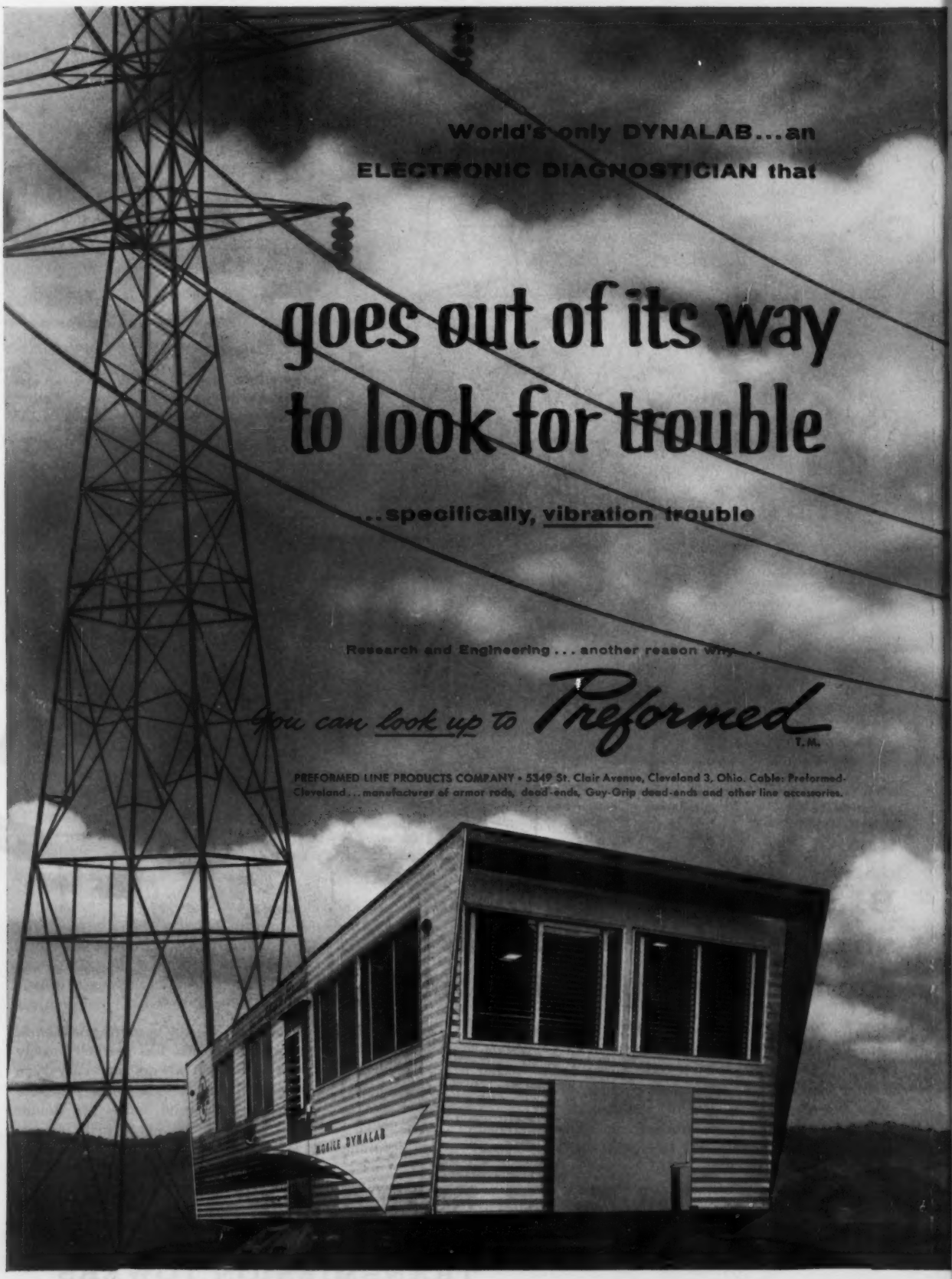
BLAW-KNOX

BLAW-KNOX COMPANY

Blaw-Knox Equipment Division
Pittsburgh 38, Pennsylvania

TRANSMISSION TOWERS

And . . . guyed and self-supporting type antenna towers for AM, FM, TV, microwave, communications and radar. Parabolic antennas for tropospheric scatter propagation. Structures custom built to support special equipment.


World's only DYNALAB...an
ELECTRONIC DIAGNOSTICIAN that
goes out of its way
to look for trouble
...specifically, vibration trouble
Research and Engineering... another reason why...
You can look up to Preformed T.M.
PREFORMED LINE PRODUCTS COMPANY • 5349 St. Clair Avenue, Cleveland 3, Ohio. Cable: Preformed-Cleveland... manufacturer of armor rods, dead-ends, Guy-Grip dead-ends and other line accessories.
MOBILE DYNALAB

No. 3 of a series...

Vibration of overhead lines still represents a major problem to the utility industry. Although significant improvements in hardware design and construction practices have been brought about through expanded research efforts, the incipient hazard of conductor failures due to fatigue and abrasive wear is becoming an increasingly important problem as the size and cost of transmission line construction continue to increase.

Laboratory vibration research has steadily progressed and has recently been accelerated by the expansion of vibration test facilities and refinement of instrumentation and testing techniques. Field measurement techniques, however, have not kept pace with laboratory advances. Therefore, relatively little quantitative data is available from field investigations for extension of laboratory studies. A few outdoor test spans and isolated field measurements have provided only sparse and often inconsistent results due largely to lack of coordination of these projects and inadequate instrumentation techniques.

The mobile vibration laboratory (Dynalab) recently completed by Preformed Research and Engineering was created by a select team of vibration engineers and electronics specialists to fulfill this need in the practical solution of line vibration problems. Operational requirements were painstakingly studied in cooperation with leading utility engineers. Radical design departures were necessary to overcome the unique problems of instrumenting and monitoring energized EHV transmission lines. A special trailer was designed to provide the high degree of mobility required to obtain data from a variety of geographical regions and remote locations throughout the country.

Already in field service, the Dynalab not only represents a significant scientific advancement in obtaining vitally important field vibration knowledge but also exemplifies the progress possible through an integrated utility-manufacturer team approach to such important and complex industry problems.

Jon Ruhlman

Preformed Line Products Company

Dallas Power & Light Co. uses Lapp 4288 Clamp-Top Line Posts to carry 60 kv through the residential areas of Dallas, Texas.

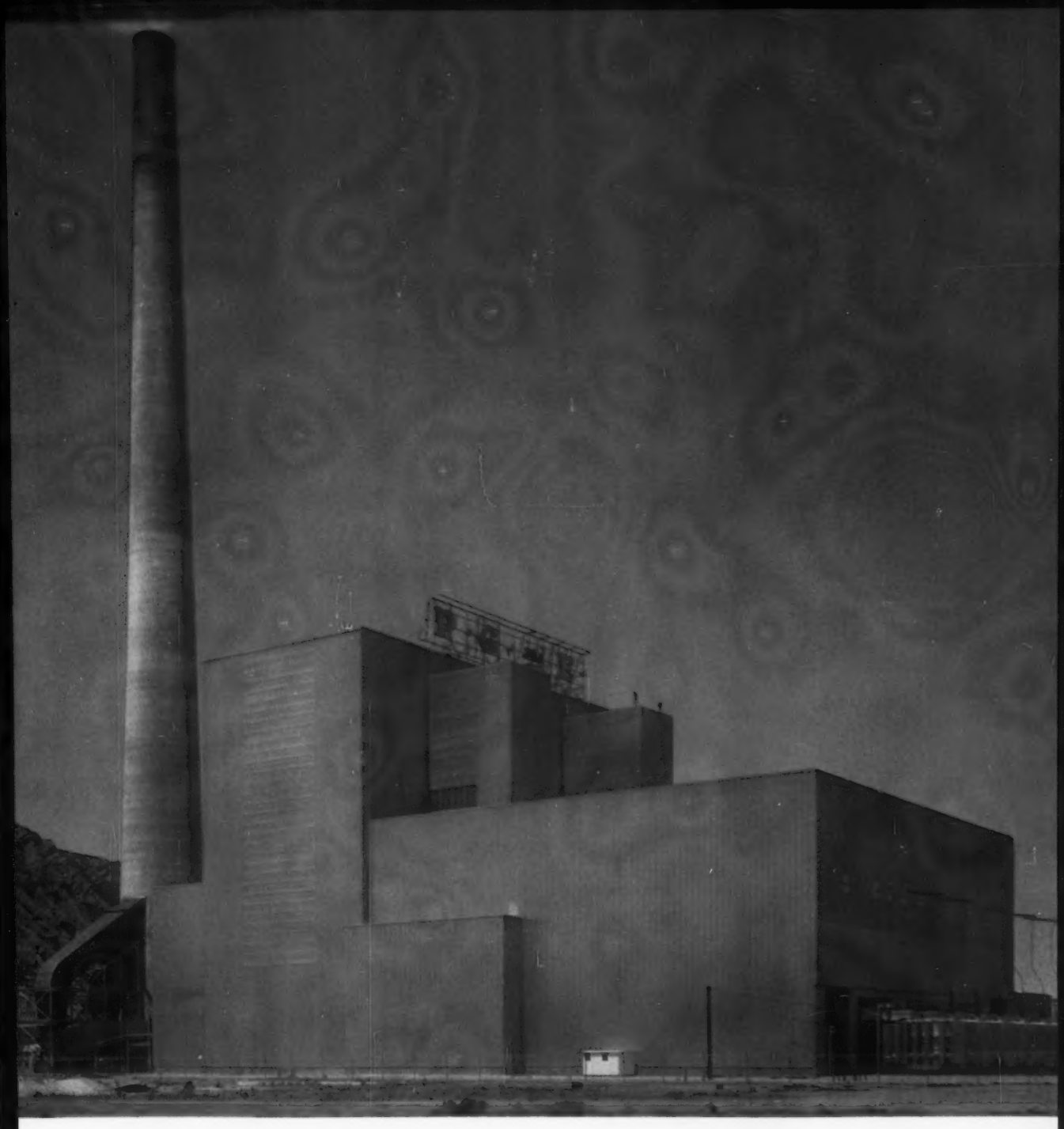
60 kv Transmission with a "Low Voltage" Look

Is your residential system having growing pains? Substations near new load centers may solve your problems if you can run a subtransmission line through residential areas without consumer objection.

There's a proved way to do it. You can run a line at 69 kv, or even higher, on "small" wood pole structures with single crossarms—and compact, sturdy Lapp Line Posts. Such a line will have the unobtrusive look of a distribution line, will be free of RIV and TV interference, and will save you money on initial cost—and trouble-free long life.

Once you've built such a line your future problems diminish, too. With one installation —good looking, high-performance, complaint-free—it will be easier to get rights-of-way for future transmission lines. Lapp Line Posts, either with tie-wire head or clamp-top, are available in voltage ratings through 88 kv.

Lapp Insulator Co., Inc., Le Roy, N. Y.



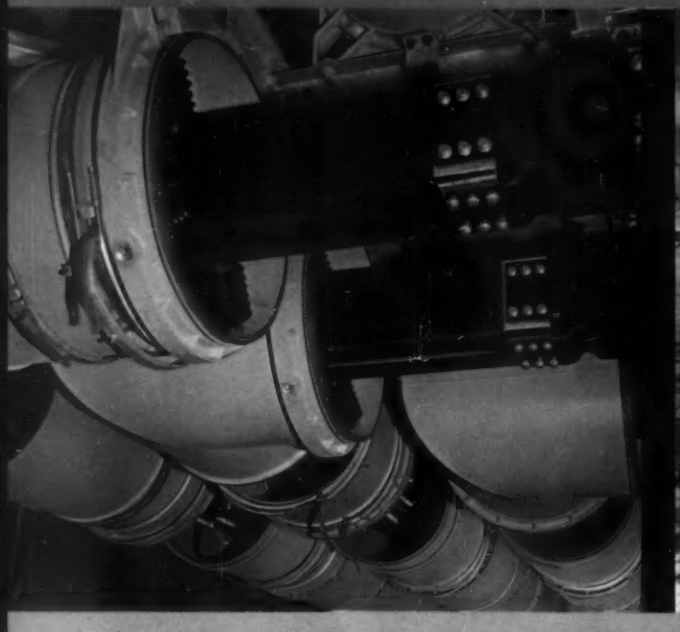
Pacific Gas and Electric Company's Morro Bay Power Station is an outstanding example of clean, modern lines achieved with ribbed walls of Alcoa Aluminum.

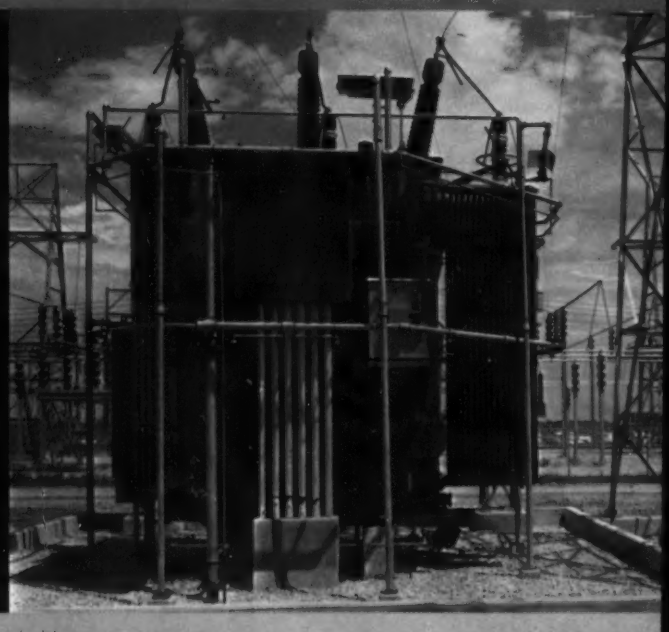
ALCOA RESEARCH

... development today for tomorrow's loads

HOW ALCOA ALUMINUM REDUCES COSTS IN GENERATING STATIONS

ALCOA'S THREE-PRONGED ASSAULT ON POWER STATION COSTS



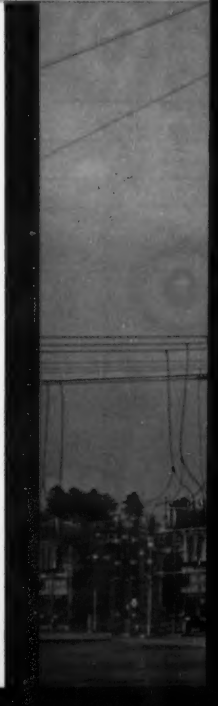


ARCHITECTURAL APPLICATIONS

There are three outstanding reasons why Alcoa Aluminum is the ideal building material for generating stations: low cost, freedom from maintenance and attractive appearance.

Walls of Alcoa Aluminum, uninsulated or sandwich type, go up fast. They require less supporting steel and a lighter foundation. They never need painting. Yet *sandwich wall of Alcoa Aluminum is the lowest cost, insulated metal wall system available.* Savings are also found in roofing, windows, conveyor framing and covers, handrails, grating, tread plate, fencing and many other applications. In every case, strong, lightweight Alcoa Aluminum offers a substantial bonus in corrosion resistance and permanent good looks.

Right: Maintenance-free beauty . . . Duke Power Company's Allen Plant at Belmont, North Carolina.



Through the years, Alcoa has adapted aluminum to new uses in power stations in three areas: electrical, architectural and mechanical. In every case, the objective has been the same: to reduce costs while advancing standards of performance. The result today is virtually an "all-aluminum" power station from conductors to condenser tubes, siding to stair treads. Everywhere you look, aluminum is helping utilities produce more kilowatts per dollar.

ALCOA ALUMINUM
ELECTRICAL CONDUCTORS AND ACCESSORIES
ALUMINUM COMPANY OF AMERICA

ALCOA RESEARCH

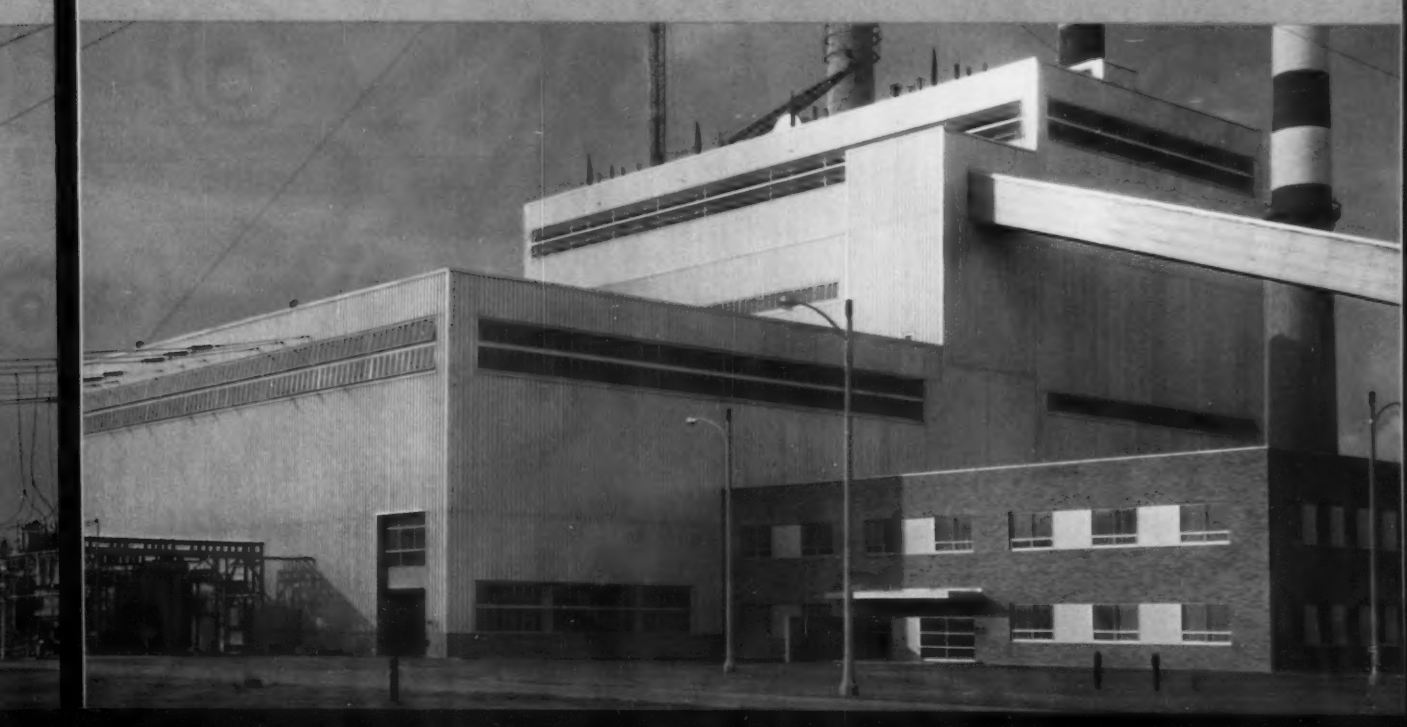
. . . development today for tomorrow's loads

ELECTRICAL APPLICATIONS

The same economy that accounts for almost universal acceptance of aluminum in overhead lines is yours if you specify aluminum for your power station. Alcoa® Bus Conductor, for example, is saving utilities many thousands of dollars, since an equivalent installation costs about one-half as much as copper. Conduit, crossarms and structures, cable, generator field windings, switchgear and isolated phase bus and enclosures, transformer windings and yoke end plates all represent opportunities for savings with Alcoa Aluminum. Soon transformer tanks and radiators will be available in aluminum. All these applications pay major dividends in lower maintenance costs, longer life and higher efficiency.

Left: Alcoa Rigid Conduit is used on this transformer at Kansas City Power & Light Company's Montrose Steam-Electric Generating Station.

Far left: Isolated Phase Bus made by Delta Star Division of H. K. Porter Co., Inc., with Alcoa Integral Web Channel Bus connected with aluminum bolts, aluminum enclosures and cast aluminum support rings at Commonwealth Edison Company's Fisk Station.



MECHANICAL APPLICATIONS

Among the foremost mechanical applications of aluminum are heat exchanger tubes. Low cost, as much as 50 to 60 per cent below other tubes, is combined with long life and superior resistance to carbon dioxide, hydrogen sulfide and ammonia. Moreover, heat transfer characteristics are equal to the best of competitive metals.

Aluminum's resistance to corrosion also accounts for major economies in condensate storage tanks, since no maintenance is required inside or outside and no iron is introduced into boilers.

In numerous applications including control tubing, tanks, covers, boiler lagging, jacketing, panels, canopies and low-pressure feedwater heaters, aluminum can help utilities to save on initial cost, on maintenance, through longer service—or all three.

Condenser tubes of Alcoa Aluminum being installed in an Allis-Chalmers Mfg. Co. surface condenser at The Detroit Edison Company's St. Clair Station.

Find out more about the use of aluminum in power stations. *Alcoa Aluminum for Generating Stations* is a new booklet listing many of the latest applications of aluminum in this field—electrical, architectural and mechanical—and containing a complete list of all Alcoa literature available on each of these subjects. It's "must" reading for every cost-conscious utility executive. For your copy, write Aluminum Company of America, 2301 Alcoa Building, Pittsburgh 19, Pennsylvania.

For more information on *any* application of aluminum in the electrical industry, call Alcoa.

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ALUMINUM COMPANY OF AMERICA

ALCOA RESEARCH

. . . development today for tomorrow's loads

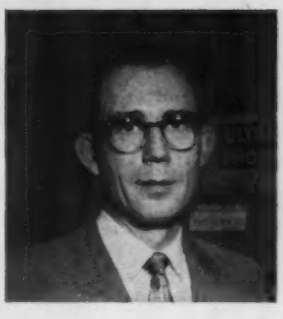
ALCOA THEATRE
Fine Entertainment, Alternate Monday Evenings

EQUITABLE SAVES $21,193
by group relamping with Westinghouse lamps

Equitable's relamping program is a big one . . . 31,503 lamps! To make sure Westinghouse lamps would meet Equitable's high standards, Equitable made thorough tests . . . they found that Westinghouse fluorescent lamps with exclusive "Ultralume"™ phosphors start bright and maintain their brightness. In fact, although Westinghouse fluorescent lamps are rated 7500 hours, with Equitable's minimum on-off cycles, the lamps average *over 13,000 hours* . . . and the number of failures after two years of burning is about 5 per cent.

To keep their building at peak lighting efficiency, Equitable cleans lighting fixtures every year. By group relamping every other year at cleaning time, the cost of relamping is an amazingly low 6.9¢ per lamp over the cost of cleaning alone. Compared with costly, haphazard replacement, Equitable saves $21,193 every time they group relamp with Westinghouse.

Whether your installation has only a hundred . . . or thousands of lamps . . . you'll find you can get more light at a far lower cost when you group relamp with Westinghouse lamps. Call your local authorized Westinghouse Lamp agent today.



"Equitable's method of Group Relamping is a result of much study and experimentation. We found that Westinghouse fluorescent lamps provide the long life we desire and they surpass even the manufacturer's specifications."

WILLIAM G. BIRKEL, *Chief Electrician, Equitable Life Assurance Society of the United States*

I'd like the facts about the Westinghouse Group Relamping System. Please send them to me by return mail.

NAME_____

ADDRESS_____

_____

Mail to Dept. A-6832, Westinghouse Lamp Division, Bloomfield, N. J.

YOU CAN BE SURE...IF IT'S Westinghouse (W) FLUORESCENT LAMPS

NEW

tubeless

photoelectric lighting control

PROVEN by 27 million unit-hours in the field

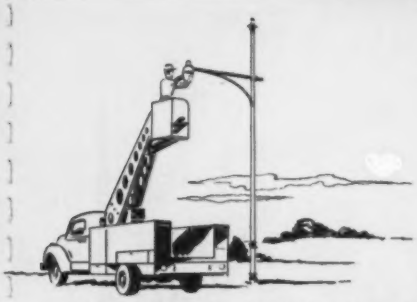
GUARANTEED unconditionally for two years

FISHER-PIERCE
series
6600A
ACTUAL SIZE

The Model 6600A shown is the basic unit in the 6600A Series. The electronic head, which contains a practical minimum of components, is enclosed in a weatherproof plastic globe. The base is fitted with a three prong twistlock plug in accordance with proposed EEI-NEMA specifications for twistlock adaptations. The five additional models all incorporate this basic 6600A unit, with appropriate additional fittings for various mounting requirements and for interchangeability with existing equipment.

GUARANTEE

Two-year unconditional guarantee from date of installation, except where mishandling, negligence or direct lightning stroke is cause of failure.



By mid-1958, 60 utilities throughout the country had more than 7000 Series 6600A controls in actual field service. Four years had been spent developing the basic control, testing cadmium sulfide cells and other components, and incorporating the results of operating experience into the design. The single reason Fisher-Pierce did this — *before* offering the control for general sale — was to assure themselves of the *dependability* of the 6600A. The objective was not "to be first" with a tubeless control; instead, it was to achieve true *reliability* in a low-cost, compact unit. The performance of the 6600A now bears out the soundness of this conservative approach.

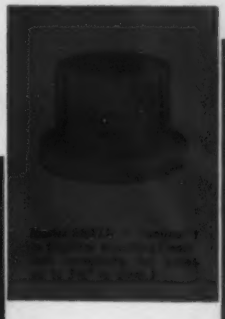
The 6600A embodies a highly simplified, efficient circuit in a rugged, compact package. No tubes or transistors are used; a CdS photoconductive cell operates a special Sigma relay directly. Major operating specifications and characteristics are briefly listed here, together with a summary of the six 6600A Series models available for various mounting requirements. For more complete information, write The Fisher-Pierce Co., 82 Pearl Street, So. Braintree 85, Mass.

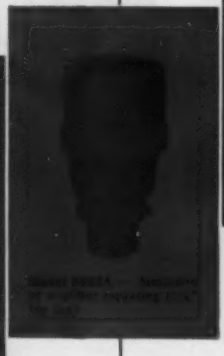
Primary Features

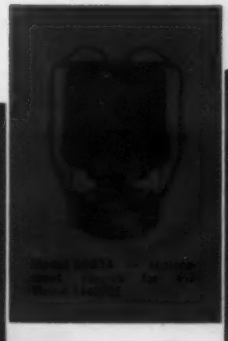
Circuit design of Series 6600A controls reflects conservative derating of all components and thorough attention to protective features. For example, the CdS cell operates on AC and its power dissipation never exceeds 70% of its rating, to insure longer life and greater stability. Also, protection of the cell from direct sunlight and more uniform, dependable turn-on are afforded by control design intended for directional operation.

- Hermetically sealed, broad area cadmium sulfide cell. Every cell is pre-aged and 100% inspected against specifications which resulted from extensive field tests.
- Sigma relay specially designed for use in this control.
- Built-in expulsion-type surge and lightning protection.
- Delayed circuit response prevents false operation due to lightning.
- Weatherproof plastic housing — not susceptible to discoloration, cracking or crazing.
- Metal parts are corrosion-resistant.
- Fail Safe Operation: lighting load will remain turned on in event of failure of electronic circuit.
- Humidity Tested to 100%.

Model 6600A — luminaire or slipfitter mounting (twist-lock receptacle, for bases up to 3" in diam.)







Primary Specifications

Supply Voltage	105-135 volts, 50/60 cycles
Load Rating	1000 watts, incandescent, mercury vapor or fluorescent
Inrush Current Rating	100 amperes
Standard Factory Setting	Turn-on 1.5 ± .5 foot-candles Turn-off 1-2 foot-candles higher than turn-on (Other settings available on order)
Power Consumption	less than 0.5 watt average (0.9 watt max. daytime, 0.06 watt max. night time)
Temperature Range	−55°C to +70°C (−65°F to +158°F)
Weight (basic 6600A control)	8 ounces

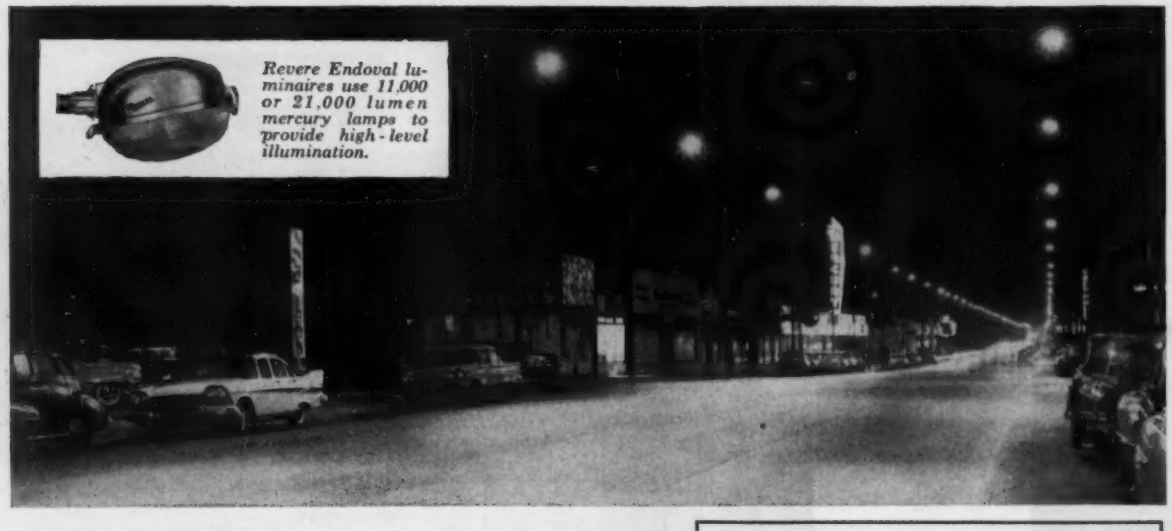
FISHER PIERCE

PHOTOELECTRIC LIGHTING CONTROLS

AN AFFILIATE OF SIGMA INSTRUMENTS, INC.

Daytime scene of heavily-traveled Chicago street with Revere Endoval Mercury Luminaires mounted at 10° tilt, 29 feet above grade, with 83 foot opposite spacing.

REVERE PLANNED STREET LIGHTING



Revere Endoval luminaires use 11,000 or 21,000 lumen mercury lamps to provide high-level illumination.

Wide, busy streets call for high-level illumination. Revere Endoval Mercury Luminaires were especially designed for such applications, to provide high-intensity lighting economically and efficiently. In the installation shown, the average illumination on the black-top pavement is 3 foot candles.

The reversible slip-fitter on the Endoval permits mounting horizontally, or at a 10° tilt, for a variety of street lighting applications. Write for Revere Street Lighting Catalog for full information on fixtures for heavy, moderate, or lightly-traveled streets.

Other luminaires in Revere's complete line

For moderately-traveled streets—Revere Star-Lux Luminaire uses up to 10,000 lumen incandescent lamps, or 250 to 400-watt mercury lamps to meet varied needs.

For residential streets—Revere Urban-Lite makes efficient use of 100, 175, or 250-watt mercury lamps for uniform light in areas where lower intensity light is adequate.

Revere ELECTRIC MFG. CO.

OUTDOOR LIGHTING

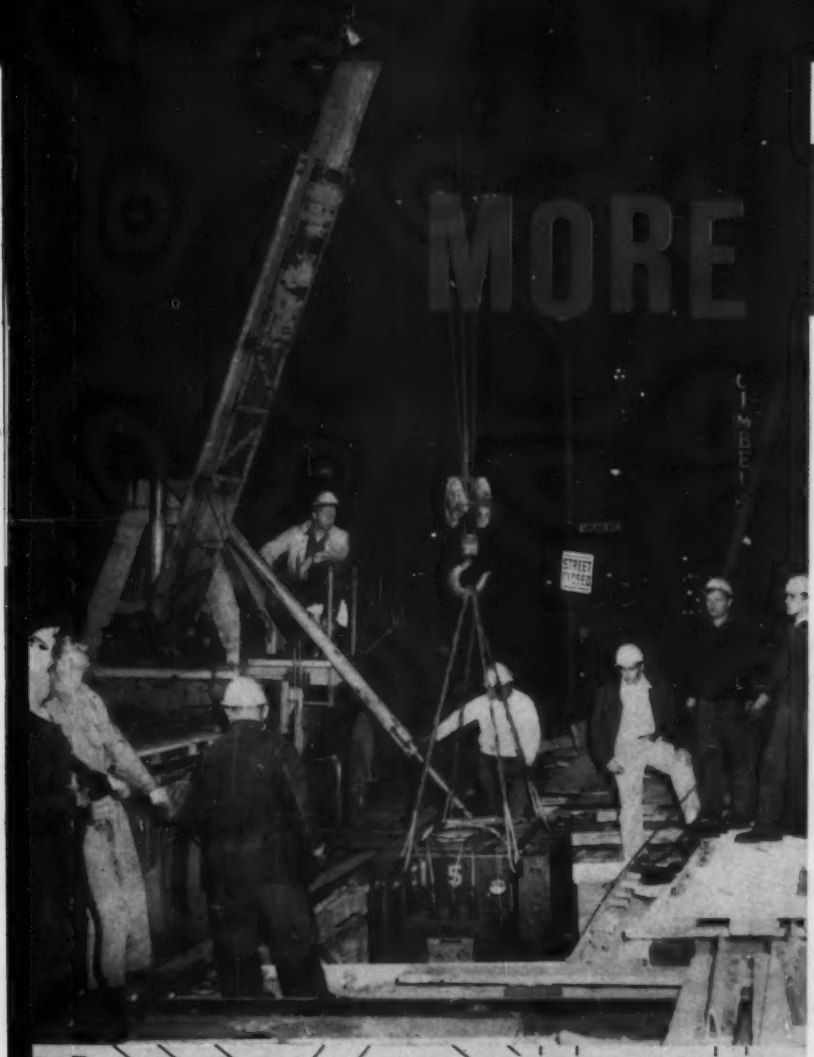
Revere Electric Mfg. Co. • 7420 Lehigh Avenue • Chicago 48, Illinois (In suburban Niles)

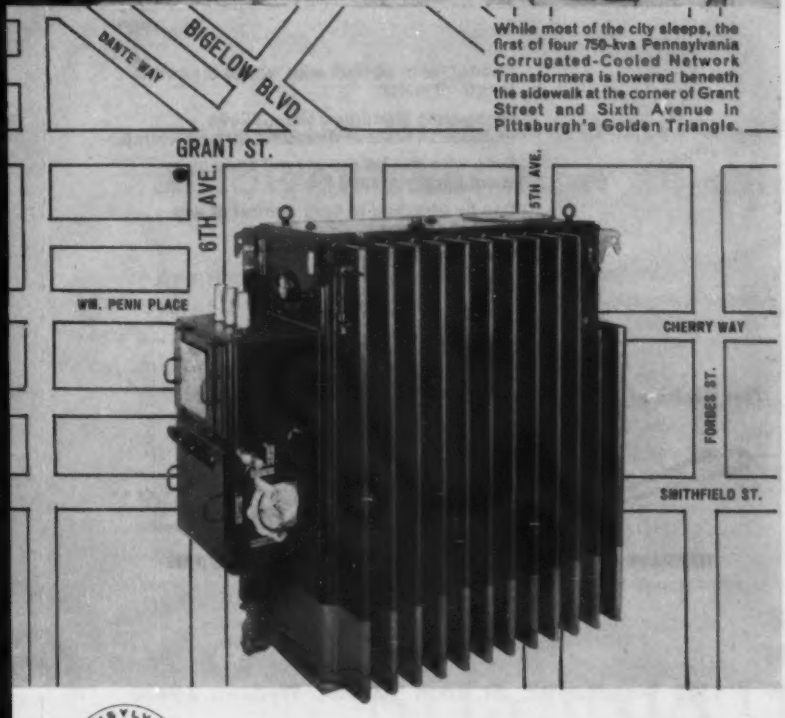
Long Distance Phone: NIles 7-6060 • Chicago Phone: SPring 4-1200 • Telegrams: WUX Niles

In Canada: Curtis Lighting, Ltd., Leaside, Toronto, Ontario

MORE POWER

goes underground for Pittsburgh's renaissance





While most of the city sleeps, the first of four 750-kva Pennsylvania Corrugated-Cooled Network Transformers is lowered beneath the sidewalk at the corner of Grant Street and Sixth Avenue in Pittsburgh's Golden Triangle.

Golden Triangle Gets New Pennsylvania Network Transformers with Corrugated Cooling

An important part of Pittsburgh's much acclaimed "renaissance" is going underground, as Duquesne Light Company installs additional power distribution equipment to meet the challenge of increasing loads in the Golden Triangle.

Beneath the sidewalk at Grant Street and Sixth Avenue, four 750-kva Pennsylvania Network Transformers have been installed to serve the lighting and power needs of one of Pittsburgh's newest skyscrapers. In keeping with other aspects of the renaissance, these transformers were designed and built with the *future* in mind. All are provided with Corrugated Cooling —the modern network transformer tank design that greatly simplifies maintenance and helps eliminate corrosion.

There are no ledges or crevices on which the corrosive materials that are characteristic of most sidewalk vault installations might collect. The smooth, straight walls of the corrugations are easy to clean and easy to paint—even from above the transformer. Coupled with the use of low-alloy, high-strength, corrosion-resistant steel, such ease of maintenance provides highly effective protection against corrosion.

Whether your own network transformer needs stem from a community renaissance or routine replacements, it will pay you to investigate the advantages of Pennsylvania Corrugated-Cooled Network Transformers. Contact Pennsylvania Transformer Division, McGraw-Edison Company, Canonsburg, Pa.

McGRAW EDISON

PENNSYLVANIA TRANSFORMERS

PENNSYLVANIA NETWORK TRANSFORMERS

DEAD END WITH

BLACKBURN

W6-2A from 6 Sol to 2 ACSR
This Clamp Will Handle All
Popular Service Drop Wires

WEDGE CLAMPS

For Light Service
W6-4A
6 Sol to 4 ACSR

For Heavy Service
W2-OA
2 Sol to 1/0 ACSR

Conductor in contact with wedge for entire length of slider.

Removable aluminum slider allows installation without threading through clamp.

Drop wire can be pre-sagged and cut to exact length needed.

Can be attached to bare neutral at any point in the span.

Your Choice of 3 Bails

STANDARD | FLEXIBLE CAPTURED | FLEXIBLE FREE

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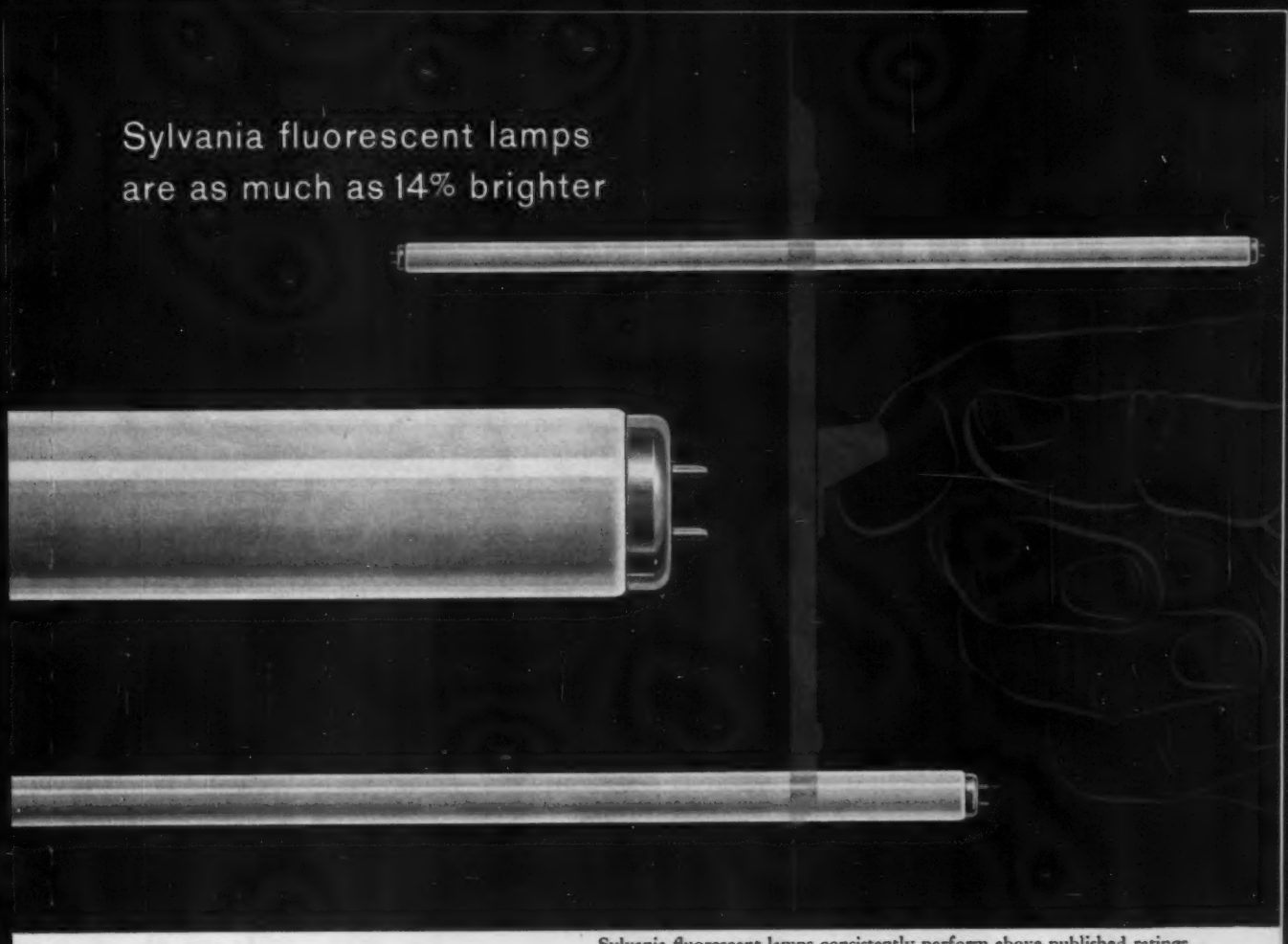

Sylvania fluorescent lamps consistently perform above published ratings from the start...deliver more light than other brands.

Another reason why

Sylvania Fluorescents give you more light at lower cost than all other brands

Advanced engineering makes Sylvania fluorescent lamps superior in many ways—makes light a better tool of production to increase profits

Tests in the laboratory and in working installations show that Sylvania fluorescent lamps consistently deliver more light.

During the past two years, alone, a comparison of Sylvania fluorescent lamp performance with the performance of other brands shows Sylvania lamps deliver as much as 14% more light.

This light output superiority means Sylvania gives you the maximum new-lamp performance you expect . . . gives you all the light you pay for . . . from the start.

Sylvania fluorescent lamps continue to give you this dividend of light throughout every burning hour . . . and deliver more light than other brands throughout their useful life.

This is another example of how Sylvania builds extra value into fluorescent lamps to help cut your lighting and operating costs.

Let your local Sylvania Representative show you how Sylvania's superiority can save you time and money. Call him today, or write:

SYLVANIA LIGHTING PRODUCTS
Division of SYLVANIA ELECTRIC PRODUCTS INC.
60 Boston St., Dept. 8L-7611, Salem, Mass.
In Canada: Sylvania Electric (Canada) Ltd.
P. O. Box 1190, Station "O", Montreal 9.

SYLVANIA Lighting Products

make light a better tool for profits

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Q.E.D.

Copper Loss Test

Ratio Test

Impulse Test

Induced Potential Test

Applied Potential Test

Core Loss Test

Sound Test

CSP Breaker Test (when applicable)

Every Moloney Distribution Transformer is proven by rigorous, automatic testing.

After a transformer has passed through Moloney's automatic test area, the users can be assured that it will provide years of efficient, dependable service.

Each Moloney transformer must pass copper loss, ratio, impulse, induced potential, applied potential, core loss and sound level tests.

Take advantage of the modern design, manufacturing and testing procedures developed by Moloney. Specify Moloney Transformers . . . All Along the Line.

ME 50-20

MOLONEY ELECTRIC COMPANY

Manufacturers of Transformers for Utilities, Industry, and Electronic Applications

FACTORIES AT ST. LOUIS 20, MO. AND TORONTO, ONT., CANADA

Editorial Comment

NOVEMBER 3, 1958

Help Street & Highway Lighting Two Ways

"The promotion of street lighting—the mighty mite—has implications which transcend the added revenue attained and which give compelling reasons for attracting our interest."

The words are Allen King's, president of Northern States Power Co and vice president of Edison Electric Institute. They were spoken at Electrical World's first Street and Highway Lighting Conference, held last month in Chicago. They set down as well as any the stake the utility has in good, modern street and highway lighting.

There are two aspects to today's street lighting that each utility must consider in the light of its own local conditions. These are the improvements in community and public relations that a utility can reap if it uses its prestige, position, and power to bring to that community the best possible street and highway lighting.

The other aspect—and there is no minimizing this problem—concerns the return on investment usually earned by street and highway lighting. In many cases, street and highway lighting is permitted to earn less than its fair share of the total return. This results in an unbalanced and unhealthy rate structure. One authoritative speaker compared this situation to that of the railroads and their long history of allowing passenger operations to return very little on investment, so long as their over-all operations were in the black. The outcome of that imbalance is painfully manifest today. The same condition in street and highway lighting should not go unchecked.

Utilities must focus their attention on solving both these problems. They should not be treated separately.

What Is Our Stake in Politics?

"Whether we like to be there or not, Gulf, and every other American corporation, is in politics, up to its ears in politics, and we must either start swimming, or drown."

This accurate observation was made by the senior vice president of Gulf Oil Corp in a recent article appearing in the company's magazine. The article relates that the oil company plans to take an active interest in practical politics as a step toward creation of a matching force which would oppose the political activities of organized labor.

No one knows better than the utility industry that our corporate enterprises are "up to its ears in politics". But have all individual utilities decided to do something about it or have some of them stood on the sidelines like disinterested parties?

In spite of the good relations that many utilities enjoy with their unions it would be folly not to recognize the immense political activities of organized labor—activities that don't always benefit our free enterprise system.

Gulf intends to do something about it by keeping tabs on voting and attendance of congressmen for its employees and stockholders. It is going to urge its employees, stockholders and dealers to become more politically active as individuals.

We suggest that you do too.

A-Power Hassle 'Makes No Sense,' Declares AEC Chief

McCone, successor to Adm Strauss (left), says initiative is lacking by some utilities

Four months after taking over chairmanship of the Atomic Energy Commission, John A. McCone is convinced there's no excuse for the nation's power reactor development program to bog down in controversy between private and public power interests.

"That may be a real issue ten or 20 years from now," McCone told EW. "But in the present infant stage of the art, it makes no sense."

The serious, gray-haired Los Angeles businessman spent his first weeks in office being briefed on activities carried on by the multi-billion dollar AEC complex.

McCone refrained from commenting publicly on controversies confronting AEC during this initial period. Now that he is beginning to speak out, he appears unlikely to make any basic changes in the atomic power policies of the Eisenhower Administration. But it is possible those policies may receive a more liberal interpretation.

McCone clarified his position at his first full press conference on two authorized controversial reactors:

- He left open the door for possible reversal the decision to build the Hanford plutonium-producing reactor. Although engineering work has been ordered, he observed that construction was some months off. He is reviewing the facts; the reactor will be built unless he discovers some reason why it should not.
- If AEC fails to get an acceptable "partnership" proposal for a gas-cooled reactor, it will order one itself "immediately." He thinks AEC will get one proposal, but doesn't know whether it will be satisfactory.

McCone sees a government responsibility to help advance the nuclear art as rapidly as possible, consistent with scientific knowhow and the nation's economic resources. This can best be accomplished, he feels, by the federal government and private enterprise working together.

"Some types of research and development and some atomic plants are so exotic that investor-owned enterprises, concerned as they must be with the profit motive, can't be expected to do the job," he says.

McCone has these comments on problems facing him and AEC:

Industry Initiative: When asked whether industry is doing all it should to advance atomic reactor technology, McCone replies, "No. Some companies are not."

He says some power companies feel there is no hurry to get into it, since costs are higher than for conventional power and promise to remain so for some time.

"Any group which can look down the road and see higher conventional fuel costs ahead should start now with a nuclear program," says McCone. Industry should train their people, "get the feel" of the nuclear art, to be in position to take full advantage of A-power when the time comes.

The AEC chairman emphasizes that some companies—particularly in manufacturing and equipment fields—are investing heavily. "The government, of course, should and will offer every inducement and protection to these companies which is consistent with the government's own interest."

Large Reactors — When asked how he applies his remarks to the controversy over government construction of successive generations of reactors, McCone says construction of a new, larger generation of a reactor is not necessarily the key to atomic progress.

"Sometime it is better to do more research and development work with the generation you already have." In fact, he adds, it may actually be harmful to go ahead prematurely, since resulting disappointment may discourage future work.

Research: McCone says research and development is needed particularly in three areas—An improved fuel cycle, metallurgy and in mechanical engineering, i.e., cheaper, more efficient components and designs.

Joint Committee on Atomic Energy: He foresees "no problems at all" with the congressional group which his predecessor, Adm Lewis Strauss, found so troublesome.

As far as the reactor development program is concerned, "I am confident we can get together on a program. That program will be supported by the Administration." However, McCone does not necessarily refer to the proposed long-range program outlined by the joint committee staff a few weeks ago. He does feel there is enough common ground on which to base an agreement.

Competitive Power: McCone feels, initially, there may have been too much optimism over early attainment of economic A-power. But he feels now there is danger of the industry becoming too pessimistic.

Fusion Power: Thermonuclear research offers "enormous" possibilities, but it's difficult to forecast how much time and money must be invested before an economic fusion reactor is built, says McCone.

Authority Sought for Quick Rate Hikes

Proposed 'model law' could set pattern for state law improvements, Washington, D. C., commissioner says

A modern Public Utilities Act should empower regulatory commissions to grant rate hikes quickly, but on a temporary basis and with adequate public safeguards, a Washington D. C., utilities commissioner told a Public Utilities Committee of the District of Columbia Bar Assn.

In his formal speech, and in a later interview with EW, Commissioner Harold A. Kertz said a streamlined law would include:

- Statutory definition of rate base "to avoid confusion and expensive litigation."
- Clear authority for utilities to disburse for general purposes—including investments in plant—cash collected through rates representing depreciation accruals.
- Carefully reworked procedure to increase speed and efficiency of commission-utility business.

In about the last five years, the states of Washington, California, Louisiana, Wisconsin, New York and Delaware have recodified and revised their laws, Kertz said. The new laws even include, in some cases, provisions reflecting key decisions of their highest state courts.

Funds for Study in Budget

Kertz said the D. C. commission has asked that $10,000 be earmarked in the District of Columbia's fiscal 1960 budget for financing a study of the old law with an eye toward revising and recodifying it.

If all goes well, Kertz said, the emerging "new law in the nation's capital could well serve as a model for other states." It would be more up to date and vital than the Uniform Public Utilities Act recommended in 1928 by the National Conference of Commissioners on Uniform State Laws.

Like regulatory provisions of many states, the District's 45-year-old law fails to confer "express statutory authority which would permit the commission to prescribe temporary rates pending a final determination," Kertz said.

This authority is needed to avoid prejudicing utility securities in the eyes of Wall Street analysts during the eight to ten-month delay between the time the rate hike is needed and granted, he said. Such delays could lead to "permanent impairment of credit," he asserted.

He said Maryland is among the few "forward looking states" and federal administrative agencies that have conferred such authority to commissions. Maryland's law, revised in 1955, authorizes the commission to fix a temporary rate for a limited period. If the rate proves too high, the commission must order a refund.

Hearing Would Precede Change

Kertz suggested that, under his proposed "model" plan, applications for rate increases or decreases would be followed promptly by brief public hearings. Then temporary rate changes could be granted, but they very likely would be no more than a portion of the amount requested—perhaps half.

He doubted that refunds would often be necessary. A temporary rate increase would not be granted unless it appeared clearly justified after a summary investigation of the company's financial condition.

In the interest of utilities and the public, state laws should carry clear statutory definition of rate base. It is needed to eliminate confusion, he said. The D. C. act directs the commission to value the property of every public utility "at the fair value thereof at the time of said evaluation."

Kertz said: "You may well ask, 'What is fair value?' Is it original cost? Is it reproduction cost? Is it prudent investment?

"Our commission has consistently found a rate base reflecting depreciated original cost of property plus an allowance for the investment in materials and supplies . . . It seems to me that it would be eminently desirable, to avoid confusion and expensive litigation, to have a statutory definition of rate base."

Should tax savings obtained through accelerated depreciation be passed back to the consumer promptly via lower rates or held by the utility for investment later in equipment? Kertz favors the latter because he believes it to be in the public's best long-term interest.

Rate cases in the District of Columbia are handled today as 25 years ago, Kertz said. "By reason of the fact that we're dealing now with more money and people, a hearing which might have taken two days 25 years ago now takes 15 days or so, and runs into 5,000 or 6,000 pages of testimony.

"There is a great need for a shortened procedure which would permit rate increases or decreases to be granted without going through some of the present detailed procedures.

"The problem is how much can we eliminate without hurting the public or companies. Any shortened procedure would have to be consistent with due process."

Quicker Handling of Cases Urged

Kertz asked the Bar Association's committee to study ways to improve procedure for "fast, excellent handling of rate cases, complaints, and so on." A committee member later indicated the group would meet in November to consider the request.

Again referring to the D. C. law —carried under four separate titles in what he called a "crazy-quilt patchwork"—Kertz recommended:

- Clarifying whether a rate order becomes effective immediately upon commission action, or after the 30-day waiting period during which the commission can be petitioned.
- Deciding whether to drop language which provides that the commission may apply to the courts for instructions as to the "elements of value" to be considered in a valuation proceeding.
- Deciding whether the Boston sliding scale of rates and dividends —long abandoned by the commission—should be dropped from the law in favor of full-scale hearings currently pursued with respect to every petition for rate adjustment.
- Minimizing repetition of material applicable to similar utilities.

Westinghouse Reveals Atomic Plans

- **Gives plans to improve pressurized water reactor type**
- **Reveals new reactor that uses pellet-size fuel elements and does not require control rods**
- **Also discloses research project on the use of thermoelectric materials in reactors**

Progress reports on its major atomic programs and new reactor concepts were disclosed by Westinghouse Electric Corp at a recent press conference. An organic moderated fluid bed reactor (OMFBR) requiring no control rods, and a method for converting heat produced in a reactor directly into electricity without an intervening steam cycle are the new concepts.

Projects discussed in the progress reports were:

1. Pressurized water reactors for Yankee Atomic Electric Co and the Societe Cooperative Electro Nucleaire of Belgium.

2. Pressure tube reactor for Carolinas Virginia Nuclear Power Associate (CVNPA).

3. Homogeneous reactor for Pennsylvania Power & Light Co.

ORGANIC MODERATED FLUID BED REACTOR will use fuel in pellet form and will not require control rods. Protruding rods support top lattice of UO_2 container

Westinghouse is developing the OMFBR for the proposed 50-Mw station of the City of Burlington, Vt. Instead of using movable control rods and fuel in a fixed position, this plant will use marble-size fuel pellets of uranium oxide, floating in oil and no control rods. The fuel pellets will lie in a large cylindrical container. Fluid-flow holes are in the bottom of the container.

Before start-up, the fuel pellets rest in a settled, packed bed. By proper choice of fuel enrichment and pellet size, no chain reaction would occur because of the close spacing of the pellets. To start the reaction the oil flow would be increased, thus lifting the pellets and dispersing them uniformly through the fluid. By controlling the oil flow, the chain reaction may be increased or decreased.

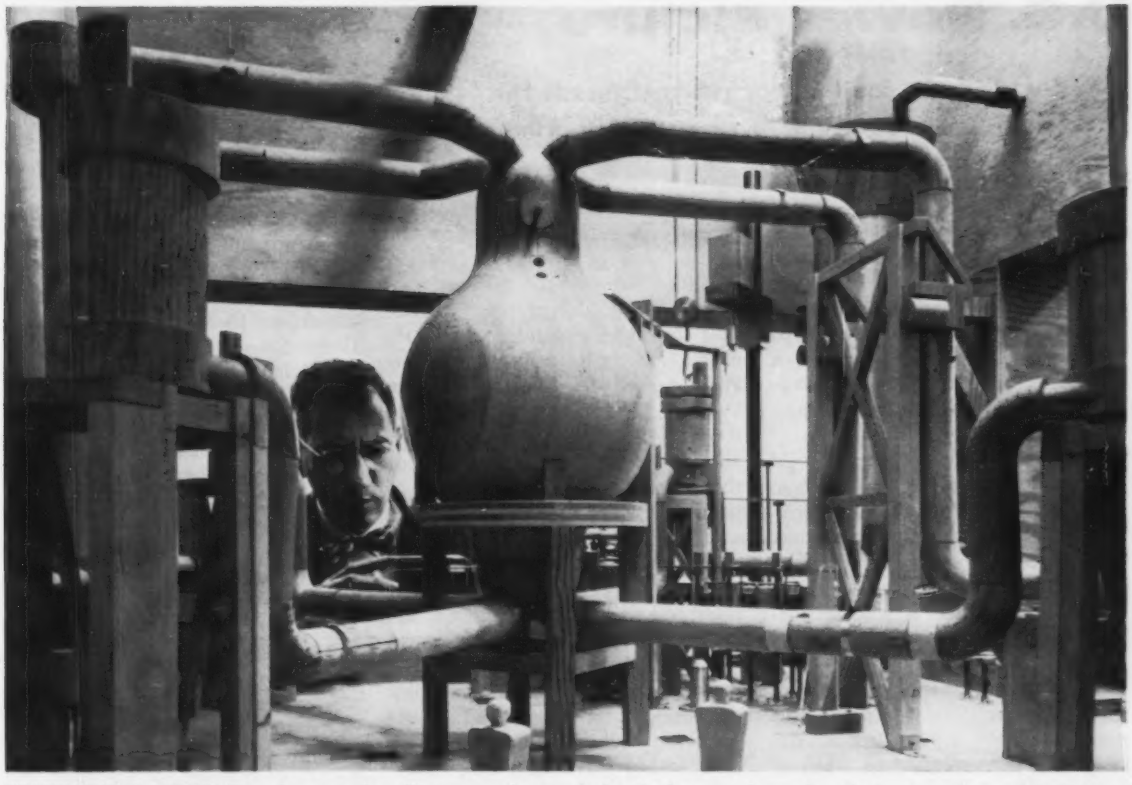
The direct conversion research is centered on use of thermoelectric materials in reactor fuel elements. Simplicity of design and construction, and efficiency of operation are the two main advantages claimed for direct conversion reactors.

System Output Would Be DC

The idea would be to encapsulate the nuclear fuel in a thermoelectric material, say of type A. An adjacent fuel element would be encapsulated in a material of type B. It would then be necessary to have a temperature difference across the two fuel elements. If this is possible, electric power would be generated directly in the reactor. The system would deliver direct current for the transmission system. There would of course be a certain amount of heat generated in the reactor but this could be dissipated by a heat removal system.

Although design has not been finalized, Westinghouse engineers visualize a thermoelectric nuclear fuel element as a flat plate with electrical connections at each end. The nuclear fuel will serve as the heat source. It will be cladded to prevent the spread of radioactive products. The thermoelectric material will surround the fuel element.

The Yankee Atomic Electric Co's 134-Mw PWR plant design was



EQUIPMENT PLACEMENT and remote handling procedures for the maintenance of homogeneous reactors can be studied with the use of wood and plastic scale model. Reactor vessel is in middle. Connected to it are four primary loops

cited as an improvement to an existing design. Nucleate boiling at the heat transfer surfaces of the fuel elements was given as a specific example of this improvement.

In discussing the Carolinas Virginia Nuclear Power Associates' project, Westinghouse engineers stressed the elimination of the large pressure vessel made possible by the use of small pressure tubes in its stead. Fuel elements will be in the tubes through which heavy water will flow and act as coolant.

Since the pressure is carried by the tubes, the outside shell can be very thin and need only be designed for 100 to 200 psi. This reactor will also increase the conversion gain by improving the neutron economy through the use of heavy water as a moderator.

Both of these types represent improvements in the PWR concept. But they have limitations in efficiency and size. To overcome these disadvantages Westinghouse is studying an integral boiling superheat reactor (IBSHR). The unit is a modified version of the pressure tube reactor. Cold water is taken into the center section tubes where it is allowed to boil, taken out of the reactor to a steam separator, and then back into an outer layer of tubes in the reactor for superheating of the steam.

This system, according to Westinghouse engineers, has advantages of high efficiency and is not limited in output in the secondary or the primary system by the size of the components and pieces that can be manufactured.

Radioactive Protection Feasible

As in all direct-cycle plants, it would suffer from this deficiency; a serious failure in fuel elements exposes the turbine, condenser and feedwater systems to the radioactive fuel in the failed fuel elements. But Westinghouse engineers are confident that they can protect the secondary part of the system from a high degree of failure of fuel elements in a system.

Westinghouse's star performer for the long-term is the homogeneous plant. It has been actively pursuing a development program with Pennsylvania Power & Light Co to determine the feasibility of building a large plant of this type.

The world's largest test loop for circulating a slurry of atomic fuel is part of the equipment used in Westinghouse's development work on the aqueous homogeneous plant. The equipment is used primarily for component development, system work, and verification of certain plant operating procedures. The testing work is proceeding satisfactorily.

At the Westinghouse Waltz Mills Test Center two critical reactor experiments are underway. One of them is the Belgium PWR reactor and the other is the core of Westinghouse's test reactor which is due to go into operation next May.

The primary purpose of the test reactor (WTR) will be to subject materials and nuclear fuels to radiation conditions similar to those encountered in an operating reactor.

U.S. Power Picture

- **Seaton seeks court test on contract, blasts Ellis**
- **Puget Sound survey finds support for partnership**

The federal government may yet seek a court review of a 1952 power contract between Southwestern Power Administration, Arkansas Power & Light Co and Reynolds Metals Co. Interior Secretary Fred Seaton disclosed the plan in a speech before the Nebraska Reclamation Association in Hastings, Neb.

Seaton said the contract, signed during the last year of the Truman Administration, "ties the U. S. government hand and foot and may prevent any important rate change for 30 long years." He emphasized, "I am hopeful that it will be possible to get it (the contract) tested in court."

Interior and Justice department attorneys have been working on the case for nearly a year, but no decision has been reached on when or in what federal district court it would be appealed. A shortage of attorneys in the civil division at Justice apparently is delaying action on the case.

Under terms of the 30-year contract—signed during the Korean War to induce expanded aluminum production by Reynolds—Arkansas P&L agreed to wheel 30-million kwhr of SWPA power monthly to Reynolds. SWPA agreed to charge an average of 5.2 mills per kwhr for the power, and to pay the power company one mill per kw for wheeling it.

In 1957, Seaton asked the FPC to permit SWPA to charge higher rates and to upset the contract. He said it violated the Flood Control Act of 1944 on two grounds: **1.** The Reynolds rate "discriminates against the interests of public bodies and cooperatives," which now pay higher rates for SWPA power—6.97 mills per kwhr. **2.** The contract does not permit SWPA to recover its cost of producing the power. The FPC ruled, however, that it did not have authority to consider the contract.

General Manager Clyde Ellis of the National Rural Electric Cooperative Association also attacked the contract as discriminating against co-ops served by SWPA.

Seaton, however, blasted Ellis for implying that the Eisenhower Administration was responsible for the contract. He charged that Ellis' attack on the present Administration shows "a complete lack of truthfulness, or his abysmal ignorance."

Warming to the occasion, the secretary also criticized former President Truman and Sen John Kennedy of Massachusetts for "a deliberate attempt to play politics with the resource development of the United States—an attempt which all of us should condemn and repudiate."

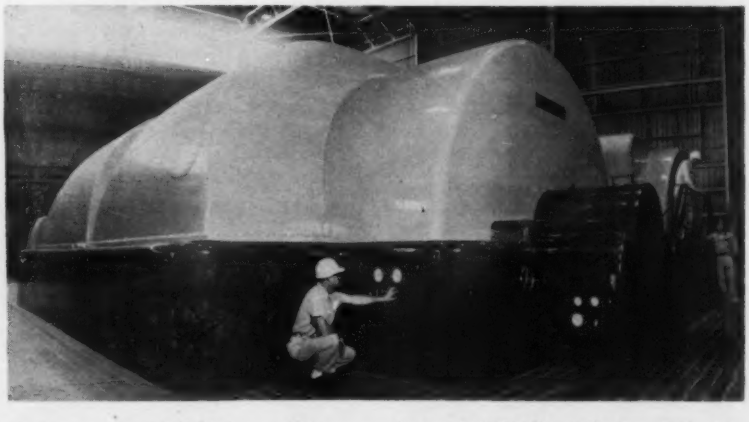
He charged that Truman's claim that the Administration has neglected federal hydro power development, Kennedy's claim that the U.S.S.R. is bypassing the U. S. in building new power facilities and Ellis' charge that the Administration is carrying out a "master plan" to destroy REA are all three "not merely distorted images of the truth, they are opposite the truth."

Seaton pointed out: "The federal government has a valid role in continued resource development in the West," but, "the 'all federal dams or no dams' policy was fallacious, and its corollary—all nonfederal dams or no dams—is equally erroneous."

• People in Washington's Puget Sound-Cascade area by a seven-to-one margin support the idea of electric utilities working together. Last year the margin favoring partnership was about five-to-one.

This is from an opinion survey for Puget Sound Power & Light Co. The sampling found a five-to-one margin (vs three-to-one in 1957) opposed to federal control of electric utilities. People of the region don't want "Washington, D. C., to be servicing their power needs," the survey report said.

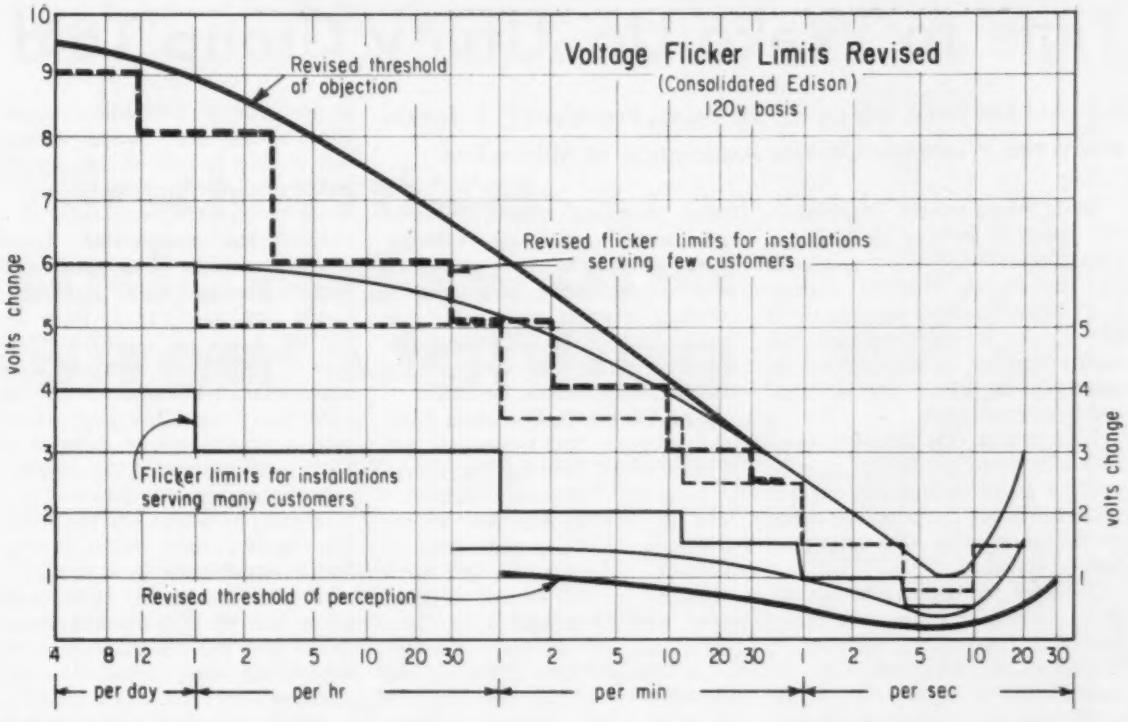
By the same token, however, by just under a three-to-one count, the public also rejects the idea of Pacific Northwest power companies banding together into one large service and development corporation.



Detroit Ed Ups Capacity With New Unit

Detroit Edison turned over its new 321,500-kw steam turbine-generator at the company's River Rouge Plant on Oct. 20. The unit, River Rouge's third, brings the plant's capacity up to 840,000 kw, and that of the entire Detroit Ed system to nearly 3½ million kw. The other two units at River Rouge are each rated at 260,000 kw; they went into operation in '56 and '57.

At dedication ceremonies, Edison President Walker Cisler commended the electrical industry in general (the new Detroit Edison unit was made by Allis-Chalmers Manufacturing Co) for research, design and fabrication advances which have resulted in lower kwhr costs.



FLICKER LIMITS for installations serving smaller customers are raised by Con Ed as a result of tests and experience. Limits for installations affecting large numbers of people, such as office or apartment buildings, will not be changed

Urge Utilities Study Flicker Limits

Brieger reveals to EEI T&D meeting that Con Ed tests have resulted in higher limits for permissible voltage flicker

Utilities might profit by reviewing their standards for voltage flicker limits, L. Brieger, Consolidated Edison Co, told the October 9-10 meeting of the Edison Electric Institute Transmission & Distribution Committee.

Although emphasizing that no industry-wide standards existed, Brieger explained that limits set by individual utilities tended to be lower than is necessary. He cited test results and operating experience of Con Ed that indicated a rise in limits is permissible.

An almost total absence of complaints about voltage flicker over a 20-yr operating period indicated to Brieger that previous irritation limits, which were based on the response of 50% of observers in staged tests, were too pessimistic.

"In staged tests the observers are more or less biased, as it is next to impossible to judge what one's reaction would be to flicker if he or she were not told what to look for and were not aware of the flicker's impending occurence," he told the delegates.

Limits Will Be Increased

As a result of the investigation, Con Ed plans to increase its permissible limits, especially in the lower frequency ranges. He expressed the belief that there is a real need to study the flicker problem, largely because of the growth of residential air conditioning and the recent revision of the EEI-NEMA motor-starting current rules.

C. E. Bathe, Oklahoma Gas & Electric Co, supported Brieger's stand. Bathe reported on a two-year survey in which Oklahoma G & E followed up all voltage flicker complaints. He explained that although present data cannot be considered complete, it is felt that present design limits are on the conservative side.

The use of a manhole extension ring to adjust manholes to grade after street paving was described by D. F. Tulloch, Boston Edison Co. Standard rings eliminate costly digging out of the manhole frame and raising it to the new grade.

Five uniform thicknesses of rings are used in sizes ranging from 1⅜-in. to 4-in. thick, depending on the change in street grade. In addition, two sizes of tapered rings are supplied for use where the pavement thickness on one side of the manhole is less than on the opposite side. The rings may be used singly or in combination to meet most grade changes.

Boston Edison has found that a

(*Continued on page* 102)

Time to Wake Up, Utility Group Told

Business has been asleep for 20 years, President F. L. Larkin warns the Wisconsin Utilities Association at Milwaukee

Businessmen are not informed on the political facts of life, F. L. Larkin, president of Wisconsin Utilities Association, told the association's annual convention recently at Milwaukee. Business, he said, has been asleep for 20 years. What we are trying to protect can be legislated away overnight.

Larkin said that although business will not use corporate funds for political purposes, there is no law against personal contributions. Also, employees must be told what they have at stake.

In order to motivate people we must reach them through the things they want, said D. L. Kirkpatrick, University of Wisconsin. He revealed that a survey of 10,000 employees and foremen showed foremen knew little about things employees wanted. A key step is ability to put oneself in the place of another and see things his way. This is the only way to reach the employee, he added.

"Public opinion demands the early development of economic nuclear power, and the private utilities must chart their course accordingly," Arthur S. Griswold, Detroit Edison, told the Electric Operating Section. He predicted that the paths to economic nuclear power will become quite clear within 10 years. He questioned the desirability of building a large number of uneconomical plants but urged privately-owned utilities to continue as the dominating factor in atomic power through participation in AEC projects.

Large savings are possible through proper application of reduced BIL transformers, said J. R. Mann, Allis-Chalmers. Mann cited the two 345-kv transformers in Commonwealth Edison's Goodings Grove substation and said $600,000 was saved on each.

Key to the application of reduced BIL transformers, said Mann, is a study of the voltage wave shapes and magnitudes of the various waves expected. The study, he said, should consider wave shapes of system faults, switching surges, lightning and normal operating voltages. More is known about switching surge voltages today, and improved lightning arresters give better protection to reduced BIL transformers than earlier arresters gave to standard transformers, he added.

John Fitzgerald, Wisconsin P&L, told delegates that techniques and equipment for locating the source of radio and television interference have been greatly improved. Places to look for trouble include defective lightning arresters, loose metal crossarm braces, frayed weatherproof wire at insulators of 12-kv lines, lack of clearance between strain insulator bolts and guys, and corrosion in suspension insulator hardware.

J. M. Henderson, General Electric, predicted economic advantage in the use of 240/480-v single-phase distribution. Actual savings will depend largely on the size of auto-transformer required in each home for serving 120-v loads.

Henderson summarized digital computer studies of a distribution system having 34.5-kv primaries. Loads considered ranged from 2.4 kva to 24 kva per customer. Savings of $32.45 per customer were indicated if a 1-kva auto-transformer could carry the 120-v load. However, estimated savings dropped to $1.17 per customer if the required auto-transformer was 3-kva.

Storm procedures and construction standards have been revised by Baltimore G&E as a result of experience with the March 1958 snow storm, said W. E. Wilkinson. Operations have been de-centralized by establishing more points for dispatching crews.

Pressure-fired boilers have proved successful, said L. W. Hoffman,

(*Continued on page* 103)

PEA: Plant Start Successful

No unusual difficulties were experienced in starting up the 165-Mw Portland station of the Metropolitan Edison Co. Although the unit has several unique features, including a subcritical-pressure once-through boiler and a cross-compound, axial-flow exhaust turbine, J. S. Bartman, plant superintendent recently told members of the Pennsylvania Electric Association Prime Movers Committee that none of these new equipment innovations were involved in the minor startup difficulties.

The Portland unit has steam conditions of 2,400 psi/1,050F with reheat to 1.050F. The steam generator will deliver 1,150,000 lbs of steam per hr. In addition to the unique features already mentioned the Portland unit has a side-entry condenser, direct energy-balance combustion control, welded condenser tubes, all welded high-pressure heaters, and an automatic coal-handling system.

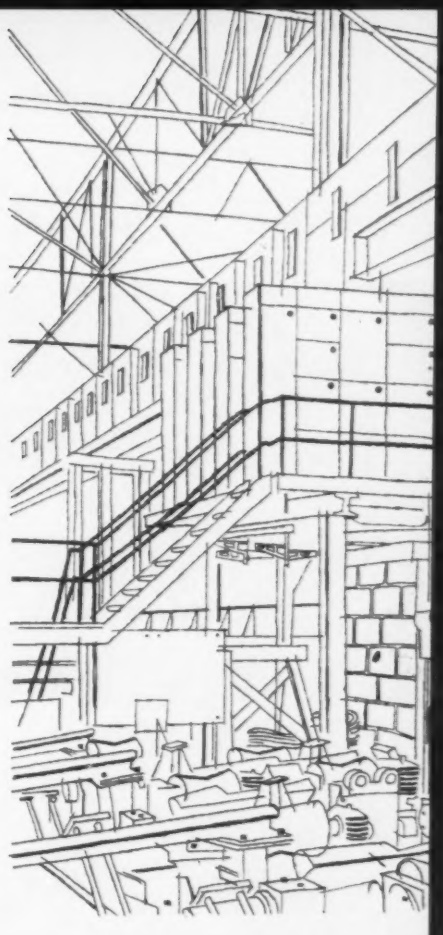
Bartman indicated that some of the steam lines were not sufficiently drained and that some water hammering has resulted. Startup experience also showed that a larger pump is needed to remove the drains from the collecting tank during startup. Bartman told his audience that the once-through steam generator is operating very well. It takes time for the silica to be removed from the cycle but he did not attribute this to the type of steam generator.

Before starting up, the cycle was given a caustic and acid cleaning. The preboiler cycle was cleaned with a caustic solution at 300F. Then the entire cycle was cleaned with a 5% caustic solution at 300F and a 3% acid solution at 200F.

Bartman was particularly pleased with the operation of the demineralizers used for the water treatment system. Five million gallons of treated water have been used in the initial startup operation. The demineralizer system has been capable of satisfactorily meeting these requirements.

PLAN '59 *Modernize now for growth and profits*

Modernize Industries and Street Lighting



Beyond the immediate concern of furnishing an expanding supply of power to their customers, utilities are becoming increasingly aware of the role they must play in contributing to the modernization of the community as a whole.

In this contribution, no single task is more significant than the obligation to help keep the industries they serve as modern, productive, and profitable as possible. Essentially, this task is one of guiding their customers toward a higher volume, lower cost production through the increased use of economically justifiable electric power.

To implement this aim, the utility effort in the past decade has taken on an entirely different aspect. Today, the power sales staff, in effect, functions as an adjunct to the customer's engineering staff. Far-sighted power sales engineers see the trend increasing in the decade to come. Section I of this report outlines the extent of this utility effort.

Possibly no area of utility activity is in more urgent need of modernization—both in the thinking about it and the execution of it—than street and highway lighting. More often than not a part of an unbalanced rate structure, and therefore carrying less than its fair share of the revenue burden, it gets little attention, much less promotion and streamlining.

But all this is going to have to change. Electrical World's recent Street and Highway Lighting Conference and survey, coverage of which is included in this modernization series, shows why. Street lighting men are faced with many problems, but the most important one—to which they must find a solution soon—is two-pronged: How can we put in better, safer street and highway lighting, and at the same time serve it on a more realistic return-on-investment basis?

The answers, of course, depend to a large extent on local conditions, but the general direction the upgrading will take is outlined in Section II of this report.

Section I

KENNETH N. McLEAN, Industrial Editor

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Section II

T. R. JORDAN, Assistant Managing News Editor

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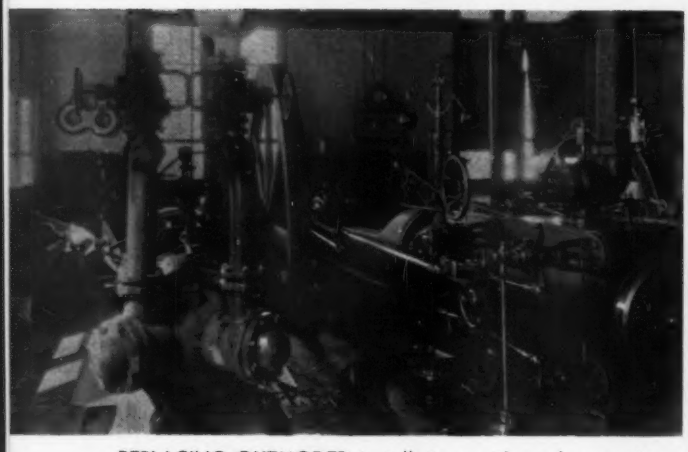
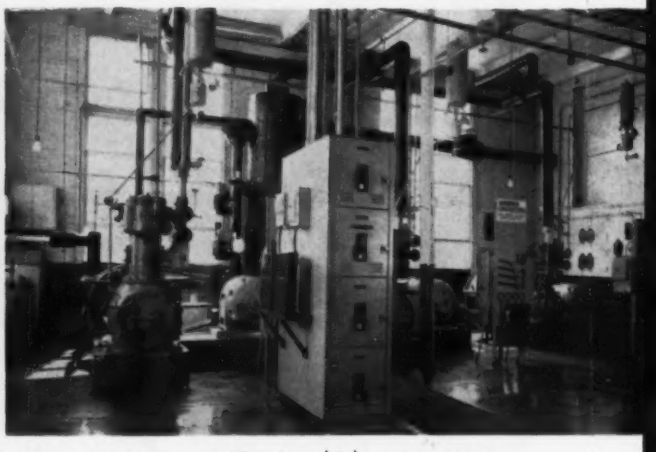
PLAN '59 **Section I**

Utilities Spur Industrial Customer





REPLACING OUTMODED installations with modern equipment assures competitive position in a high cost economy

- **Productive economy is recognized as essential to free enterprise system**
- **Utility welfare and progress tied to customer efficiency**
- **Principal utility contributions are education and consultation**

Veterans in the vanguard of the struggle to preserve and strengthen the free enterprise system, utilities have long been aware of the close relationship between the vitality of this system and the economy's ability to produce. A continuously expanding economy of abundance has traditionally been both our system's crowning glory and its principle bulwark against domestic and foreign threats. Similarly, no system based on profit as a reward for effort can retain its vitality indefinitely in an era when economic and political pressures consistently operate to reduce profits.

Keenly aware of the relationship between these vital concepts, utilities have been one of the most vigorous exponents of industrial modernization to increase productivity and safeguard the economy's just profits. Moreover, there are sound business reasons for the utility interest in productivity. Industries which become uncompetitive through failure to modernize production create depressed business conditions in their area and sap the vitality of the residents and commercial firms.

Conditioned by these concepts, the utility attitude is consequently one of interdependence and mutual

Mass Educational Programs Pace

A highly effective instrument in the utility drive for customer modernization has been the mass educational program. Although the wide variation in customer systems and problems makes the "personal service" of the power sales engineers indispensable, these mass programs are a valuable adjunct that enables the utility to reach a broader audience with available manpower and do much of the ground work for the vital individual counseling.

One of the earliest mass educational programs was the General Electric "More Power to America" program. Included in this ambitious program, now in its fourteenth year, are one-day Productivity Forums, which give managerial personnel a concise survey of the advantages of modernization; a roster of 19 industrial training films to bring industrialists up to date on new wiring, welding, materials handling, and automating techniques; and a monthly magazine for plant technical personnel.

From its inception, the utilities have made extensive use of this program to enlighten and train their customers. A total of 118 Productivity Forums, co-sponsored by GE and the local utilities have been held since 1949. More than 23,000 industrialists,

Modernization

effort for the common good of all business. This attitude is effectively expressed in the business creed of one of the larger eastern utilities:

"We of Pennsylvania Power & Light Company recognize that our Company's prosperity is indissolubly linked with that of the area we serve. Our Business Development program will, therefore, be directed toward doing everything possible to develop and improve the economy of the area and to make our service welcomed and sought . . . We will recommend . . . only those uses of electric service which increase efficiency, production or profit in their businesses or enrich living in their homes."

The need for modernization is extensive, including both production and plant service equipment. One recent estimate is that it is a 35-billion dollar job to modernize obsolete equipment in manufacturing and mining industries alone.

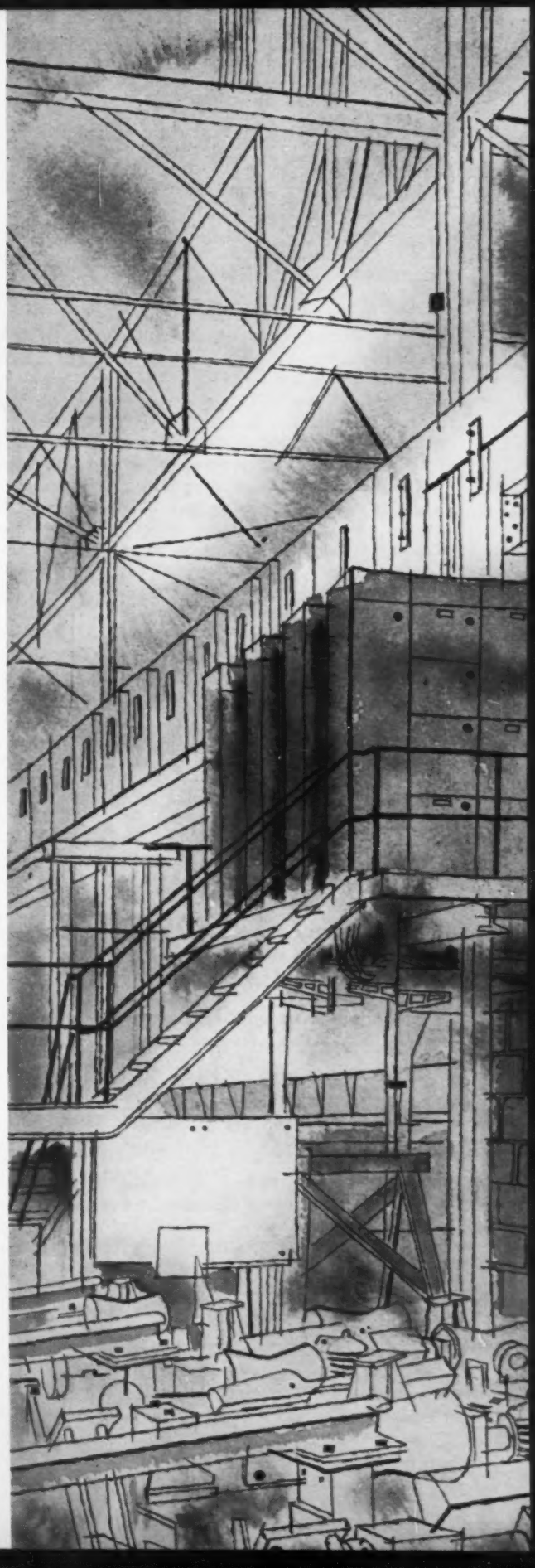
Utilities recognize that a task of this magnitude is and for economic reasons must be a slow process. They see their role in industrial modernization as one devoted principally to education and service. Consequently, their efforts have been directed to four principal goals:

- To make industrial management more aware of the need for modernization, show them what has been done, and suggest areas in which their plants might benefit from modern techniques.
- To train plant technical men in the application of modern electrical equipment for production and power distribution.
- To make their own highly trained personnel continuously available for personal consultation and service in modernization of both power system and productive equipment.
- To cooperate in every way possible to make their customers' operations more productive, more efficient, and more economical.

Utility Effort

have attended these forums. Similarly, utilities have bought an estimated 400 to 500 MPA training film programs, including 160 in the last five years alone, to carry the modernization message to plant technical people. Audiences for such programs run from 50 to 75 and any given program may be used many times in a single utility territory.

Another General Electric tool used by utilities is the Nela Park lighting training. Many companies sponsor annual or semi-annual trips to the Cleveland installation to familiarize interested customers with the capabilities of modern lighting.



A more recent utility tool in promoting industrial modernization is the Westinghouse Power-up Program, kicked off in early 1957. Among its components:

- The "live" Power-Up Road Show, a short skit emphasizing the advantages a modern industrial distribution system in today's plants.
- Industrial forums, full-or half-day sessions designed to point up the value of modern techniques to top and middle management.
- A series of educational films covering areas where power can be used to improve production.
- A Power Chek-Up kit to enable industrial personnel to check the adequacy of their own plant distribution system.

To date, 110 utilities have used the Power-Up Road Show, at 129 locations, to tell the modernization story to 42,000 managerial and technical people. A total of 4,720 Power Chek-Up kits have been placed in the hands of industry. The industrial forums have been used both in large metropolitan areas and in smaller communities where one industry predominates. Similary the Modern Illumination Techniques course is flexible, broad-gage training course, has been used frequently by over 50 utilities to train their customers.

In addition, many utilities have adapted the manufacturers programs or incorporated portions of them into their own local programs. Typical is the Union Electric Co. After a highly successful productivity Forum, co-sponsored with GE, brought out 350 industrialists, Union Electric set up its own forums in each industrial district of its service area. Thus far, nine local sessions have been put on, with attendances of 70 to 170 customers.

GE PRODUCTIVITY FORUMS have been sponsored at 118 industrial centers for 23,000 cutomers

Perhaps the most widely used single program is the IEC Metal Sheath Heater Course. Aim of this 12-hour, 6-session course is to teach industrial personnel to use low temperature electric heat to improve production techniques. It has been used by 44 U. S. utilities and given to more than 10,000 industrial customers. Many utilities use it repeatedly, training new customers each year.

Participating utilities threw their full weight behind the course. Several hired instructors from local colleges and universities to teach the course.

Response from industrial customers was equally whole-hearted. Industrial management encouraged their technical people to participate, paid the token fees, and in many cases reimbursed their employees

PLAN '59

Local Utility Activities Back Up

● Local programs are well established, widely used, and highly regarded.
● Activities are tailored to local needs, given by local sales staffs.

Supplementing the nationwide industry and manufacturers' programs are the extensive activities undertaken by the individual utilities. Tailored to meet local needs, they range from large-scale promotion efforts, such as the automation excursion shown at the right, to the small informal evening meeting.

Heavyweight of the local efforts is the training program, aimed at plant technical personnel. Since the first such programs were set up, some eight years ago, they have gained a reputation of being well-organized, thorough, and readily comprehensible. As a consequence, response from both the technical personnel and industrial management has been both widespread and enthusiastic.

The range of programs in use covers almost every aspect of industrial electricity: process heating, maintenance, air conditioning, lighting, motor control, and automation. Combining the best of traditional and modern educational techniques, the programs make heavy use of visual aids, demonstrations, and lectures, but emphasize student participation through homework and classroom response.

One of the trailbreakers in local training programs was the West Penn Power Co. Serving a territory that is rich in industry but poor in training facilities, West Penn early realized the contribution that adequate technical training could make to a more modern industrial plant. The result was a low temperature process heating course, the now familiar Metal Sheath Heating Course, which was subsequently adopted by the IEC and used throughout the country. A more recent effort was a highly successful substation maintenance course, for larger industrial customers, to teach industrial personnel

METAL SHEATH HEATER COURSE, sponsored by IEC has trained more than 10,000 plant technical people

WESTINGHOUSE POWER-UP road show has been shown to 42,000 managerial personnel at 129 locations

for the time spent in attending the course. Participants were almost unanimous in their praise.

Another big industry effort, now on the launching pad is the EEI's industrial lighting course. Scheduled to go into use late this year, it will train plant personnel in modern lighting techniques. Already 35 utilities have evidenced an interest in the program; ultimately, as many as 50 may participate.

Utilities have been equally enthusiastic in supporting other groups, notably the AIEE and the various electrical leagues. A notable example is the study group in distribution for industrial plants given last fall to over 200 participants by the Connecticut section of the AIEE. All major utilities in the state supported the course by publicizing it among their industrial customers, providing transportation, and subsidizing a portion of the text book cost. Connecticut Light & Power furnished the auditorium. Similar groups in other parts of the country have received comparable utility support.

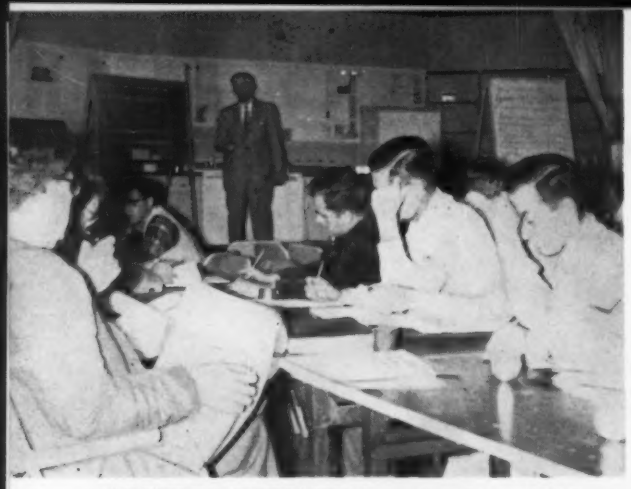
A strong believer in the cooperative approach is the Philadelphia Electric Co, which channels most of its efforts through the local Electrical Association. Working with this group, PE has helped sponsor training courses in industrial heating and lighting. Other utilities who work extensively with such organizations: Indianapolis Power & Light, Arizona Public Service, Idaho Power Co, Duquesne Light Co, New Orleans Public Service, Cincinnati Gas & Electric Co, and Rochester Gas & Electric Co.

Nationwide Programs

to handle high voltage equipment safely and efficiently. Total attendance was over 300. Although the course was given during normal working hours, some companies sent as many as eight men to take advantage of this valuable training.

Latest addition to the West Penn curricula is aimed at the big bottleneck in industrial modernization, the plant distribution system. The new course, organized along the lines of the Metal Sheath Heater Course, will teach the fundamentals of system de-

TO TELL AUTOMATION STORY to its industrial customers, Pennsylvania Power & Light Co flew 55 industrial executives to Appliance Park at Louisville. Customers got first-hand look at latest automated production techniques in action



INDUSTRIAL CUSTOMERS learn by doing. Classroom problems and homework encourage student participation

sign, selection of voltages, coordination of protective devices, and similar design techniques, with emphasis on the practical aspects.

Another vigorous self-starter in the mass training field is New York State Electric & Gas. To help industrial customers modernize their plant lighting facilities, NYSE&G in 1956 launched a comprehensive industrial lighting conference. More than 300 conferees completed the course, which was given in nine locations throughout the state. Among the results: a number of redesigned lighting systems, an increased awareness of lighting as a production tool, a big increase in new lighting installations.

Now swinging into operation is a NYSE&G air conditioning clinic to teach industrial personnel to apply this new tool to improve productivity. Still in the planning stages, a similar session on automation. Illustrating the customer reaction is a letter from a large industrial customer acknowledging announcement of the air conditioning course. "I assume this is another of those fine courses you have been sponsoring. . . . The men who have taken several of them have found them extremely worthwhile and consequently, we have four men interested in this program."

Taking a more dramatic approach to promoting modernization is a new Union Electric program. Billed as a "Modernization Matinee," it depicts the problem as the "melodrama of modern industry, which pits the hero, Modern Methods, against the villain, Outmoded Methods, to protect the fair Greater Profits."

Presented to an audience of managerial and technical personnel, it demonstrates how the industrialists can keep ahead of competition and solve production problems with modern techniques. The new program, using both films and live show, kicked off to an audience of 170 September 30th, and is scheduled to be put on at least seven more times in the local industrial districts.

These are not isolated cases. The great majority of utilities with significant industrial loads have or are using similar programs. For example:

Connecticut Light & Power has staged numerous courses on motor selection and control and is currently working on a lighting course.

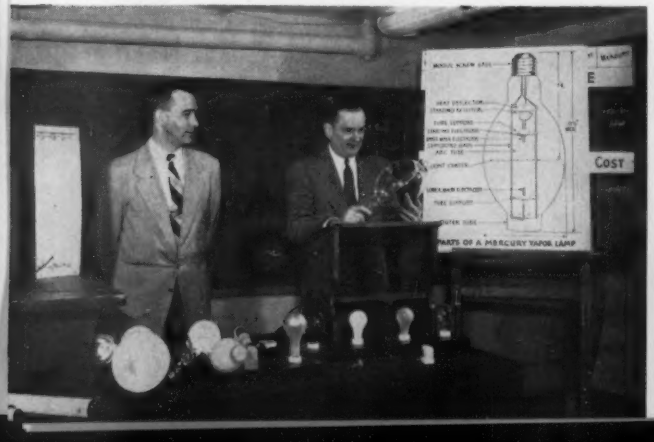
New England Power Service, the first utility to use the More Power To America program, has run its own courses on heating and lighting for years, has training programs on space heating and process heating on this year's schedule.

Cleveland Electric Illuminating Co sponsored a Modern Illumination School which had an average attendance of 163.

A variation in the field of mass education is Duquesne Light's new monthly publication, Shop Talk. This 4-page folder, distributed to smaller customers, keeps the customer up-to-date on the latest production techniques, familiarizes him with the basic principles of electrical equipment, and provides a plethora of other valuable information calculated to make his operation more efficient and more profitable.

A radically different type of help to industrial customers is the Niagara Mohawk story. When a rock fall destroyed the major source of 25-cps power in the area and forced dozens of major industrials to convert to 60-cps power, the utility hired an outside consultant to survey more than 70 of the larger plants and provide them with an authorative estimate of the conversion cost. Three top division engineers were assigned to help customers redesign their systems and substations. Where the customer did not have land available for a substation, Niagara Mohawk helped them lease the necessary sites.

LOCALLY SPONSORED UTILITY courses such as this session on industrial lighting techniques and practices give industrial technical personnel the necessary knowhow to produce modern installations in their own plants



PLAN '59 Power Engineer Plays Vital Role

Key man in the utility effort toward industrial modernization is the power sales engineer. Intimately familiar with his customers processes and problems, this highly trained specialist supplements the mass educational programs with individual counselling and advice to his hundred or more customers.

Ultimate aim of all his efforts is to keep his customers as productive and competitive as possible in an economy of continually increasing costs and rapidly changing technology. Reflecting this objective is the statement of one power sales manager that, "The power sales engineer's biggest contribution is to encourage modernization."

In effect, he serves each industrial customer as a combined design, operating, and production engineer, continuously on call to make certain that each gets maximum benefit from his electric power. Among the services he performs for his customers are:

Assisting in distribution system design;

Keeping the customer abreast of the latest production techniques and equipment;

Preparing lighting layouts;

Advising in selection of voltages;

Solving flicker, transient, and voltage problems;

Advising on power factor correction;

Determining system protection requirements;

Helping the customer boost productivity, cut costs, and improve product quality;

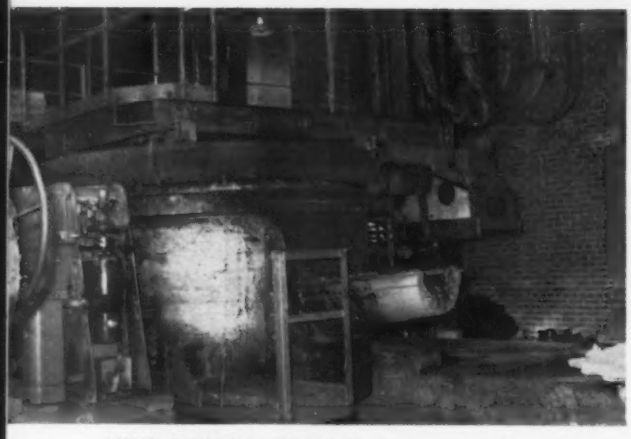
Advising on scheduling to minimize power costs;

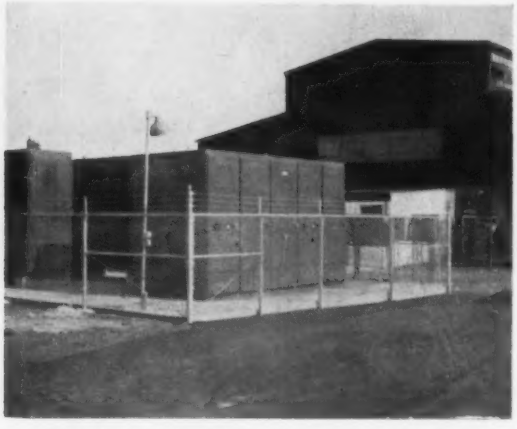
To all his customers he is "the utility," the man primarily responsible for seeing that adequate power to keep the production machinery rolling is always available. To the thousands of medium and smaller sized firms whose own engineering resources are limited, he is often the principal source of technical advice in the electrical field.

Although he is by title and training a salesman, his principal commodities are ideas and concepts—the concept of a growing economy made more prosperous, more powerful, and more productive through the use of modern production techniques.

PLAN '59

The Results: Utility Efforts Pay





NEW ELECTRIC FURNACE for increased production, backed up by modern substation demonstrates progressive industrial attitude. Utility sales engineer helped design sub, worked with customer to pare power costs

Case I

Two key themes from the American Brake Shoe Co's credo tell the American Manganese Steel Division's story in a nutshell: (1) "Find a better way to do it;" (2) "Make the company a better one to sell to and a better one to buy from."

Translated into practice, the first phrase has produced a 3-year modernization program that stepped up output of Amsco's high quality steel castings, enabled them to develop two new product lines, and boosted productivity as much as 200% in some areas. The second phrase keynotes the exemplary cooperation between Amsco and Delaware Power & Light Co to make the new operation smooth, economic, and efficient.

As a result of the modernization, substation capacity has been boosted more than 200%. Included in the program are:

- A new sand handling system that mixes and conditions the sand and delivers it to the molder with about one-fifth the man-hr formerly required;
- A new rotating molder that turns out four times as many flasks per man-hr;
- A new 4,000-kva electric furnace, to supplement the existing 1,800-kva unit.

To hold operating costs to a minimum, Amsco and DP&L worked out an arrangement for off-peak operation of the new 4,000-kva furnace. DP&L prepared a suggested substation diagram, provided two separate 12-kv feeders to assure a highly reliable supply for the melting operations. They also worked with the company engineers in selecting protective devices and setting up the relay coordination.

The attitude of M. B. Williamson, works manager of the Amsco plant, demonstrates the close liaison between the two organizations: "We think the DP&L men are a fine group and depend on them for advice both in new construction and in normal operating procedure."

Case II

A utility sponsored course in industrial lighting techniques helped produce this modern lighting installation in an eastern machine shop. After attending the 12-hr lighting conference, the company's assistant superintendent designed this high-quality, glare-free system, which produces a minimum of 50 foot-candles. The installation won the assistant superintendent a utility prize, his choice of a slide rule, engineering handbook, or light meter.

Freedom from glare and specular reflection have enabled the employees to see better and quicker and improved their morale. Increased production is expected to pay for the cost of the installation.

The new system uses 48 slimline, two-lamp fixtures, mounted on 10-ft centers in rows 6 ft apart.

Off In Modernized Plants

Case III

A utility sponsored trip to General Electric's Nela Park and a custom lighting layout tailored to the customer's ideas and needs—these were Duquesne Light Co's big contributions in helping the H. P. Gazzam Machine Co modernize the lighting in their machine shop in Pittsburgh, Pa. The results —the machine shop is now one of the show places in the area. Providing 55-ft-c of uniform illumination, the color-improved mercury lamps boosted both production and employee morale. Secretary-Treasurer W. E. Wetzel sums up company reaction "If I reduce errors by one per month, the new lighting will more than pay for itself."

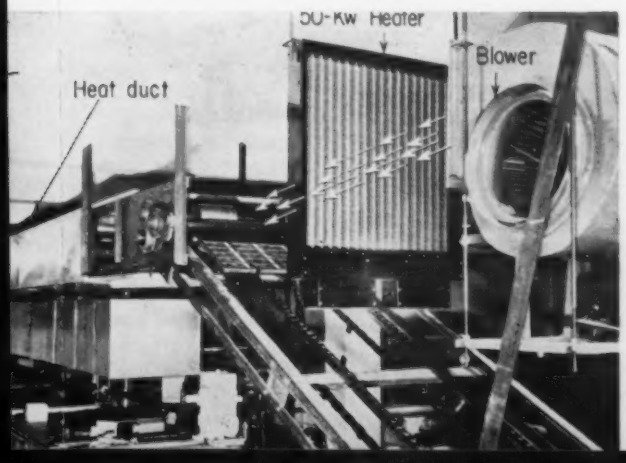
Operating a typical small machine shop, with 12 employees, Wetzel was aware of the importance of good lighting. But the Nela Park trip, made with 45 other industrial customers, gave him a chance to see the latest in lighting techniques and equipment and helped him evaluate his own requirements more accurately. Subsequently, a Duquesne sales engineer helped him appraise the various types of lighting and prepared the suggested lighting layout for his plant.

IEC Heater Course Stimulates Modern, Economic Installations

Used by more than 40 utilities to train industrial customers in the use of low temperature process heat, the Industrial Electrification Council's Metal Sheath Heater Course has fostered dozens of modern heating installations throughout the country. Shown below are two typical installations built by industrial personnel with the aid of knowledge acquired at the course.

Used to preheat candy molds, the 50-kw resistance heater shown at lower left has paid off in closer temperature control, increased production, and freedom from condensation problems. A 3-hp blower forces warm air from the heater over the molds as they are conveyed through an insulated duct. Temperature inside the duct is thermostatically controlled.

At lower right is a car bottom furnace used to stress relieve pressure vessels for power boilers. Designed and built by plant personnel, it has cut production costs and speeded up production by enabling the company to do its own stress relieving, instead of sending vessels to an outside firm. Results: trucking costs eliminated; three to five days knocked off production time; cost per lb less than one-half the cost of subcontracting the job. The furnace uses a total of 388 kw of resistance heaters.



PLAN '59 **Section II**

Street & Highway Lighting:

- **Electrical World Street and Highway Lighting Conference speakers say principal problems are to upgrade lighting to improve community and public relations, and at the same time, put revenues on a more realistic percent-return basis**
- **New equipment will help. Some standardization is a future possibility, provided it doesn't stifle competition**
- **Future points to much higher levels, wider applications**

The modernization of the street and highway lighting systems in their respective service areas is a "must" for electric utilities who wish to: (1) continue to improve their community relations; and (2) put it on a more realistic basis, as far as its revenues and return on investment are concerned.

These are the principal conclusions of the recent Electrical World Street and Highway Lighting Conference held in Chicago. Co-sponsored by NEMA's Street Lighting Section in cooperation with the Street and Highway Lighting Committee of Edison Electric Institute, the conference was held to investigate the vast array of street and highway lighting problems that run the gamut from outmoded rate structures to the reduction of crime.

In the two-day (Thursday-Friday, Oct. 16-17) conference, no one set down the utility stakes in the street and highway lighting game so succintly as Northern States Power Co's President Allen S. King. Speaking both in his capacity as NSP president and EEI vice president, King put it this way: "The promotion of street lighting . . . has implications which transcend the added revenue attained and which give compelling reasons for attracting our interest.

"What I am saying is that our street and highway lighting departments offer splendid instruments for improving our community relations. This is a public relations activity that has a tremendous value in our community relations, and one which we can build toward broader public relations in other fields . . . it is the show window of a utility company."

King, who by no means feels the revenue aspects of a utility's street lighting activities can be ignored, makes no bones about the importance of what he says are its aspects that "offer real plus values."

"In driving through the country one often gains an impression of the utility company which operates in a given town by the quality of its street lighting. If we approach a well lighted community, we say to ourselves, 'a progressive utility must be serving this town, I wonder which one it is.' Isn't that true? Doesn't our reaction to the lighting of a town far exceed the actual revenue benefits directly derived from the lighting?"

Revenues Are Important

But the revenue aspects are important. And good street lighting—as a benefit to the community and the utility—is not a mutually exclusive concept. There are some who feel that the present street lighting situation in many utility companies is economically unsound and will, in the long run have a possibly disastrous effect. Ebasco's Rate Manager R. S. Quig compared the street lighting portion of the electric utility business to the passenger operations of the railroads. Said Quig: "Recently we have been watching a prime example of the fallacy of allowing one class of business to contribute less than its fair share to the over-all return of the business. For many years the railroads . . . have been receiving little or no return on their investment in passenger-carrying operations. Since freight operations were generally profitable, this condition was allowed to exist for many years. To change it was considered to be a tremendous undertaking from a political and public relations viewpoint. As long as over-all operations were in the black, an unbalanced price structure was permitted to exist.

"Confronted with increasing competition and reduction in net income, railroads can no longer support the out-of-pocket losses of the passenger business. Also, with the long period of deficit passenger operations there has come about a general deterioration of passenger service. Clearly there is a parallel in the plight of the railway passenger business and the situation that public utilities find themselves in with respect to street and highway lighting."

Quig feels that, although utilities may be protected from geographical competition, they definitely face it, in making rates, from:

- Industrial generating plants.
- Substitute services, such as gas, oil and coal.
- Other utilities for new plant location.
- Government power projects.
- Government-financed distribution projects.
- Other wooers of the consumer's dollar.

Furthermore, Quig reasons, the utility business is a high-investment industry with exceedingly small profit margins, and that other classes of utility business cannot continue to assume burdens not properly assigned to them. He feels that with the better street lighting the public wants, and the necessity for modernizing with new available equipment to give

'Modernize a Must'

it to the public, higher revenues are necessary. He thinks that utilities may be on the verge of a breakthrough in this matter. His reasons include the increased municipal consciousness of business, opinion, and community leaders, reflected in their support for well-planned programs for adequate parking facilities; better traffic control; better schools and libraries (expenditures for these latter two have been upped 350% in the past 15 years); police and fire protection (200%); and health and sanitation (nearly 450%). During this time street and highway lighting revenues have risen only 87%, says Quig.

He feels it can be made profitable by using:

- Modern aggressive merchandising and promotion techniques.
- Advanced engineering practices.
- Financially sound rate structures and simple contracts.

Other Things Count, Too

But if community relations and the rates-revenues question were the big subjects at the conference, they were by no means the only ones. During the coffee breaks and bull sessions in the corridors of the ultra-lighted Chicago Lighting Institute, utilitymen, manufacturers and trade association people button-holed speakers on community and area development aspects of street and highway lighting other than those covered by King and Quig; the findings of ELECTRICAL WORLD's Street and Highway Lighting Survey (p62); equipment ownership and maintenance practices; multiple and series street lighting service; equipment trends; the Federal Highway Program and its lighting market; equipment standardization; support outside the industry for street and highway lighting; and a peek into the street and highway lighting future.

The key man in the street and highway lighting picture is John Q. Public, according to E. C. Powers, Educational Director of the Street and Highway Lighting Safety Bureau. He feels that we, although the utilities have a great deal to gain through good street and highway lighting, the nation as a whole will never get the kind of lighting it deserves and wants until "we as fellow citizens, working in a community, provide for that community the best we can provide."

The problems encountered by utilities and manufacturers in modernizing street and highway lighting vary with the type of streets and the location of the two. In a panel discussion on promotion activities, G. G. Wheeler, Northern States Power Co, and chairman of EEI's Street Lighting Committee, set down the dimensions of the project with: "There are 4½ million luminaires (in the country) with most utilities prepared to promote. At 300 w per

SPEAKERS at Electrical World's Street and Highway Lighting Conference included, l to r, R. S. Quig, manager, rate dept, Ebasco Services, Inc; Kirk Reid, past president, Illuminating Engineering Society; E. C. Powers, educational director, Street & Highway Safety Lighting Bureau; and Allen S. King, president, Northern States Power Co, and vice president, Edison Electric Institute

luminaire, street lighting is a load of 1,320,000 kw. Light these streets to IES Code standards, and the number of luminaires and the load will double."

Tampa Electric's Jim Banton, talking on residential street promotion, described his notoriously successful street lighting activities as "bringing the public up to this in steps . . . teaching them to crawl before they walk."

Dayton P&L innovator Herb Nonneman (EW, July 1, 1957, p 74), said commercial street lighting was the start of a complete street lighting program for any community. His reasoning: "A poorly lighted community, especially a business area, tends to 'fold up' at night. Well lighted towns stay alive. People circulate more; stores, recreation and amusement areas, and social centers stay open longer. Such a program stimulates community growth."

No panel member's presentation stimulated more audience questions than that of Ohio Power's R. K. Derry. Derry has been putting barnyard lighting on farms all over his service area (1,656 to date). Not road lighting in the strict sense, some of Derry's lights are on street lighting rates, and his program may be the first step in better rural road lighting.

Maintenance of street and highway lighting has almost always been a mixed blessing for utilities. Mitchell maintenance Co vp J. C. Strasbourger feels that the $500 million investment in street lighting by private utilities must be protected by proper maintenance. His advice for keeping costs down: newer, more modern equipment which enables crews to handle more units per day, thus cutting costs.

Equipment Trends

In the street lighting game, equipment trends and developments are as important a subject as any. Sylvania's R. R. Wylie emphasized this in introducing his panel of manufacturers on lighting and equipment trends. Quote Wylie: "Many new products . . . may help you produce good street and highway lighting with benefits to the consumer and the utility." Here's a panel rundown:

Light sources—Anyone of the three modern light sources can be used too for a good street or highway lighting job, according to Line Material's Stacy Standley. The industry has an obligation to help user evaluate the best source for his purposes, to give him an attractive, effective and economical job. "Such sources will benefit utilities, manufacturers . . . the public and economy will ultimately gain."

PLAN '59 Electrical World Survey Profiles

The success of any given utility's street and highway lighting activities—as with everything else it does—depends upon the outlook and encouragement given them by its management.

It is a logical corollary, therefore, that to understand a utility's attitude and actions with respect to street and highway lighting, it is first necessary to know something about the thinking of management on the subject. Carrying the argument a step farther, it is necessary to influence management in order to change a utility's street and highway lighting activities.

Recognizing this, Electrical World offered to conduct a simple "management attitude" survey on the subject of street and highway lighting before the Executive Committee of EW, NEMA and EEI representatives that met last summer to decide the format and program of the Street and Highway Lighting Conference.

The results of that survey were presented at the conference by John Damon, EW Commercial Editor. They are printed here as part of the conference coverage.

Survey forms were mailed to some 244 utilities, of which 119, or 48.7% replied. Because of the nature of the subject, no attempt was made to ascertain the meter representation of these 119 electric power suppliers.

Of these 119 utilities, 110 are investor-owned, six are municipally owned, two are public power districts, and one is a wholesale power distributor. The population of the communities and cities served by them varies from a few thousand to a figure approaching nine million. As with the meter repre-

Luminaires—The unitized mercury luminaire—containing optical assembly, ballast and control—will take center stage, says GE's H. J. Chanon. Fluorescent, Chanon feels, is further in the future, because of greater expense. Big interest in it now is in 4-6 ft high-output lamps.

Circuits and controls—Safety and reliability are the primary determining factors for the kinds of equipment to be used to control street lighting circuits, said Westinghouse's E. B. Karns.

Speaking of control, Middle West Service Co's S. W. Anderson addressed himself to the advantages of both series and multiple control. Concluded Anderson: "The deciding factor on whether a series or multiple system is installed is usually economic . . . Usually . . . the multiple circuit is the less expensive of the two. But the series circuit still has its application . . . in areas where few distribution transformers have been installed."

No conference on street and highway lighting today would be realistic if it ignored the Federal Highway Program. R. H. Harrison, Bureau of Public Roads engineer at Chicago outlined the dimensions of the highway program to conference-goers. GE's Art Harrington, in a follow-up presentation, sketched its $50 million, 50-Mw lighting market.

Equipment standardization is coming more to the forefront in street lighting circles (see EW survey findings below). Big need is interchangeability, but nobody—utilities or manufacturers—wants competition for better products stifled. This was the conclusion of Line Material's Phil Clark (speaking for manufacturers) and Niagara-Mohawk's Art Green (for utilities).

The S&H Lighting Future

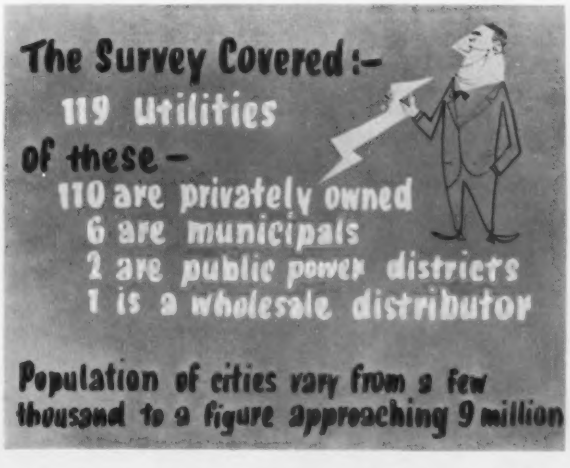
What does the future hold for street and highway lighting? Many things, says Kirk Reid of GE, speaking as Past President of IES. Among them:

- It will be a 10 billion kwhr load by 1968.
- Luminaires will jump 50% to 7½ million.
- Filaments will drop to 90% of total, mercury will jump from present 3% to 6%; and fluorescent will quadruple from 0.5% to 4.0%.

And the big future needs will be . . .

- More research, especially in illumination incidence and pavement brightness.
- A technique for measuring roadway visibility.
- A technique for measuring lighting comfort.
- A way to improve visibility in fog.

Utility Management Outlook


The Survey Covered :-
119 Utilities
of these -
110 are privately owned
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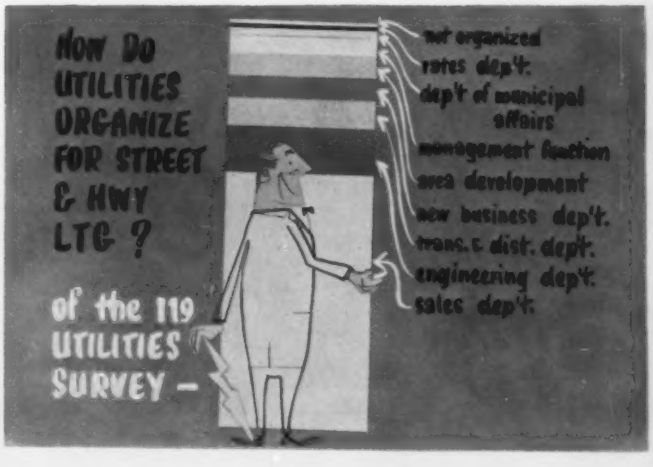
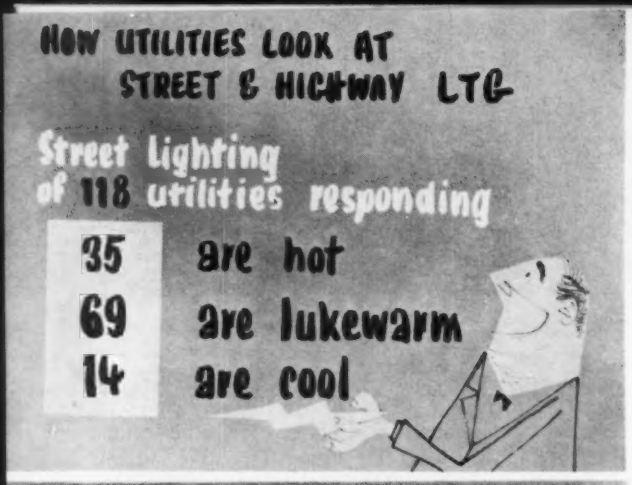
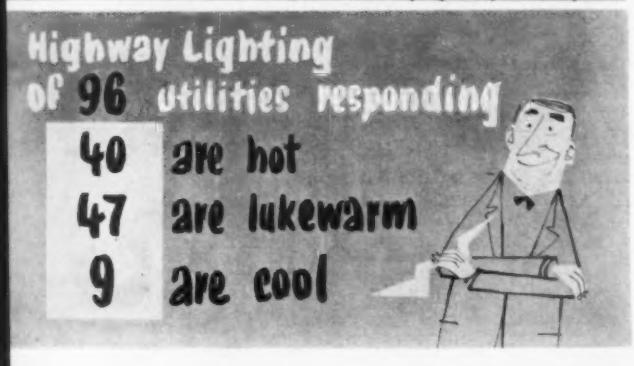
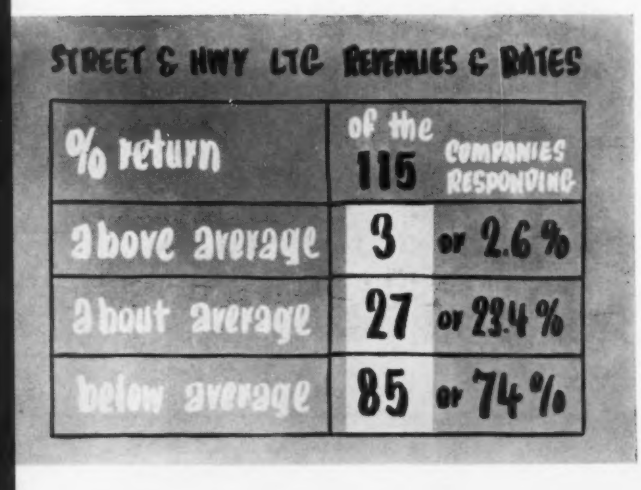
1 is a wholesale distributor
Population of cities vary from a few thousand to a figure approaching 9 million








STREET & HWY LTG REVENUES & RATES
% return
of the 115 COMPANIES RESPONDING
above average 3 or 2.6%
about average 27 or 23.4%
below average 85 or 74%

sentation, no attempt was made to correlate street lighting and population on a per-capita basis.

In any survey aimed at management, the place of an activity within the utility's organizational structure is particularly important. It's position in the organization chart may often be the determining factor in such matters as the how, why, when and where of its promotion. The utilities in the Electrical World survey showed an overwhelming preference for putting street and highway lighting under the Sales Vice President or Commercial Manager. Seventy-five of them, or 63%, have their street and highway lighting in the sales department. The next largest category, but by no means a good second, is the engineering department. Here 15 utilities have put their S&H lighting activity; this represents about 12.6%. The balance are divided, without any discernable pattern, as follows:

Transmission & Distribution—8
New Business—6
Area Development—6
Management Function—5
Municipal Affairs—2
Rates and/or Research—1
Not organized at all—1

How do utility managements "feel" about street and highway lighting?

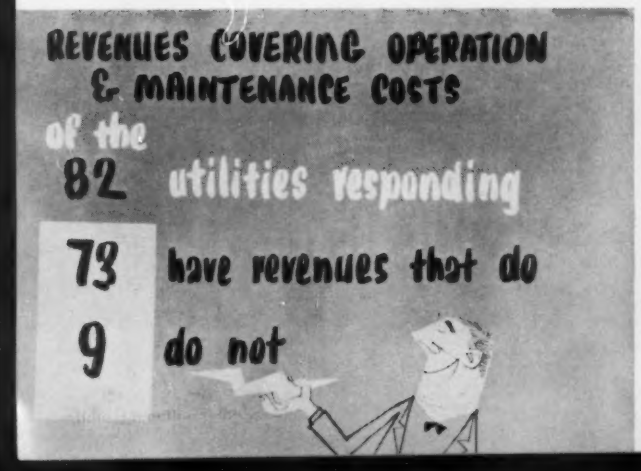
This is a subjective question, of course, and must be qualified. Qualifying descriptions for the terms "hot", "lukewarm", and "cool" (used for space reasons in the illustrations) are as follows:

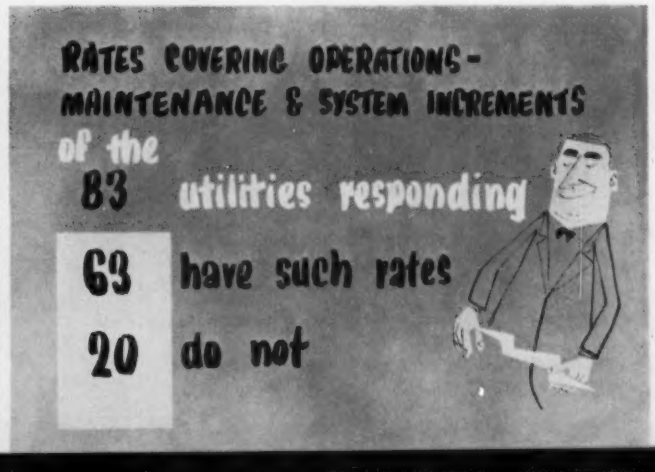
Hot—Looks upon street and highway lighting as a good load builder and revenue producer. Sees it as having good public relations value. Feels earnings are commensurate with investment and promotion costs; thinks it is comparable to other loads.

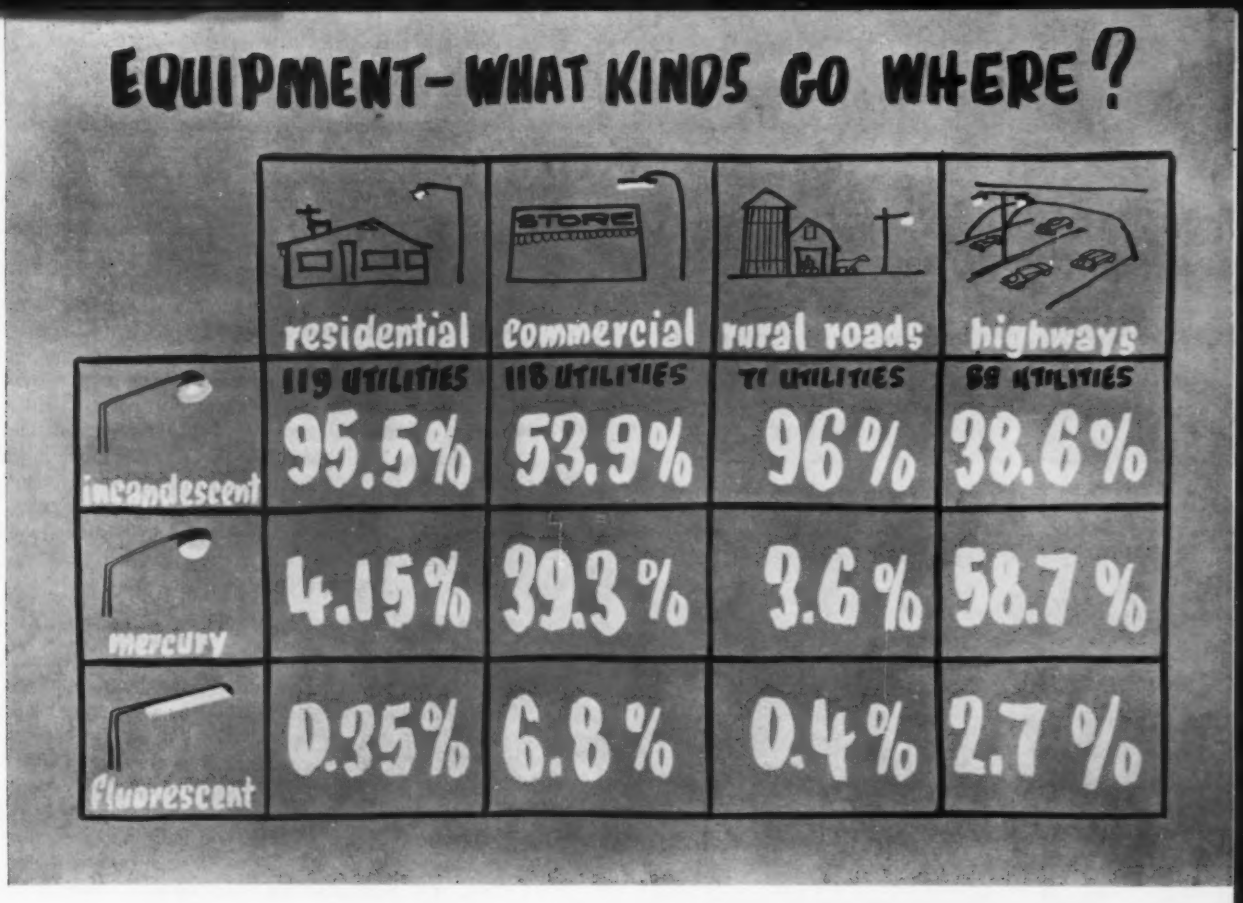
Lukewarm—Load just about pays its way. Company tries only to cover costs of service.

Cool—Load does not pay its way. It is sold at the barest minimum rate. No attempt is made to cover any costs.

With regard to street lighting only, most of the utilities fall in the "lukewarm" category—69 of 118 reporting, or 58%. The reason is not hard to find. Most companies—and this was attested to time and again at the conference itself—have set street lighting rates low for political or public relations reasons, and hence cannot qualify under the "hot" category. (More about rates later.) This results in low rev-







enues or return on investment usually, and tends to dampen management's enthusiasm. A somewhat higher number of utilities than was expected said the were "hot"—35, or 29.6%. Only 14 reported "cool."

Regarding highway lighting only (and here we are speaking of superhighways with clover-leaf intersections and no traffic lights), the surveyed utilities show even less enthusiasm. The figures, under the same qualifying conditions are, for 96 utilities: Hot—40; Lukewarm—47; and Cool—9. The percentages, respectively, are 41.7%, 49% and 9.3%

One of the principal criticisms utilitymen make when they talk about street and highway lighting is its low return on investment. This was clearly backed up by the survey findings. Of the 115 utilities replying to a question asking them to check the street and highway lighting earnings situation *with respect to the other loads within their utility* as "About Equal to Average," "Above Average," or "Below Average," 85 of them, or three-fourths, said it was definitely below average. Only three (2.6%) said it was above average. About a quarter report "average" earnings.

When it comes to rates and revenues, most utilities try to cover the operation and maintenance of their street and highway lighting systems.

Asked whether their revenues covered such costs, 73 of 82 (89%) said they do; nine said they do not.

What do they figure into their rate base for street and highway lighting? Almost all try to cover their operation and maintenance. A somewhat smaller group, 63 and 83 responding, or 76%, also assign some increment of their plant to street lighting. This increment is usually the "back-up" system necessary to the lighting.

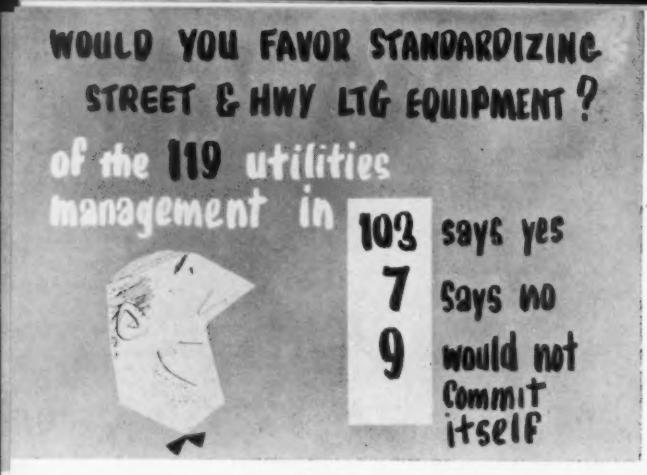
Equipment and Changing Markets

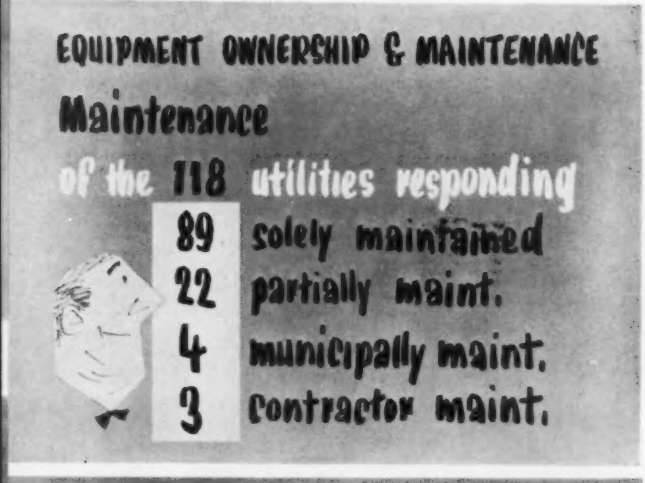
The constant improvement of street and highway lighting equipment has resulted in a changing market pattern for the three principal light sources—incandescent, fluorescent and mercury vapor.

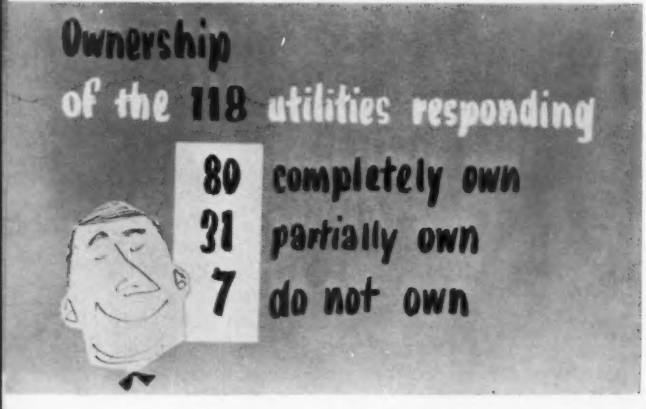
Indeed, it was the introduction of the mercury vapor lamp in 1935 in Los Angeles that cut into a market that had belonged exclusively to incandescent lighting. The first fluorescents for street lighting 10 years ago further complicated the picture. Here, based on the reports of surveyed utilities, is the present picture . . .

Residential streets—The big market belongs to incandescent. It has 95%, whereas mercury and fluorescent together account for less than 5%. But this picture is changing, as mercury units become available in softer, more attractive colors. In 10 years something like 10% of the nation's residential streets will be lighted with mercury or fluorescent units.

Commercial streets—In the downtown shopping areas, where higher levels of illumination are needed with increased pedestrian and vehicular traffic, mercury and fluorescent have made significant inroads. While most of these streets 25 years ago were incandescent, today only 53.9% remain so. Almost 40% of these streets are now lighted with mercury sources,


WOULD YOU FAVOR STANDARDIZING STREET & HWY LTG EQUIPMENT?
of the 119 utilities management in
103 says yes
7 says no
9 would not commit itself





taking the returns from the 118 utilities as a representative cross-section. Fluorescent's take: 7%.

Rural roads—Here, admittedly, we suffer from a dearth of good statistics. Only 71 utilities proffered equipment information on their rural road market. Based on what they said, however, incandescent is king in the country. Rural roads—96% of them—are lighted with filaments. Although the rural roads may stave off the invasion of mercury and fluorescent longer than residential streets, the long-range trends still point to a lessening of incandescent's share. True, costs of equipment, service and maintenance may be less than with mercury and fluorescent, but the constant urbanization accompanying the population exodus from the city is bringing with it more traffic, and therefore, the same needs for higher lighting levels than incandescent can comfortably provide. Mercury and fluorescent have 4% of this market.

Highways—The superhighway, give or take a year or two, is the same age as the mercury vapor lamp. With its higher vehicular speeds, it is to be expected that the high output sources, such as mercury and fluorescent, would be a natural to serve it. And they are. Mercury has 58.7% of the superhighway lighting market among 89 reporting utilities; incandescent 38.6%, and fluorescent 2.7%. Look for a rise in the fluorescent share of this market in the next few years, as the Federal Highway Program gets underway.

Speaking of equipment, what do utilities want from manufacturers to help them in their street and highway lighting operations?

Standardization, but with Competition

One thing they would like to see is some degree of equipment standardization among manufacturers. This does not mean that everyone should make the same items, and let competition go out the window. Hardly. But what is wanted is a measure of interchangeability that will help utilities cut down the inventory they must now stock, and thereby hold the line on costs. This, in turn, will help increase return on investment. Of the 119 utilities surveyed, 103 of them, or 87% said they'd welcome some standardization. Seven turned it down, mostly because they were afraid it would stifle competition and improved product development, and nine would not commit themselves.

Product-wise, many utilities would like to see more unitized equipment come along. A significant number asked for twist-lock photo control cells, and self-contained luminaires with ballasts and controls.

How much of the street and highway lighting systems that utilities serve do they own? The question of ownership and maintenance is a thorny one, and you find strong opinions among utilitymen as to what system or systems are best. Too many local and internal considerations are involved to permit generalization. The survey shows that most utilities completely own the systems they serve—80 out of 118, or 68%. Thirty-one (26%) own part of their systems, and only seven (less than 6%) own none.

The percentages are even higher where maintenance is concerned. Again, among 118 utilities . . .

- 89 solely maintain their systems
- 22 partially maintain them
- 4 are maintained by municipalities (not municipally-owned utilities); and
- 3 are contractor-maintained.

Reprints of the Electrical World Street and Highway Lighting Conference and Survey are available along with complete Conference proceedings for $10 the set.

Power Equipment Tests and Test Intervals

Acceptance tests and routine tests with test intervals used by Tennessee Valley Authority are listed for various pieces of power apparatus and auxiliary equipment

Acceptance Tests Are Made on This Equipment

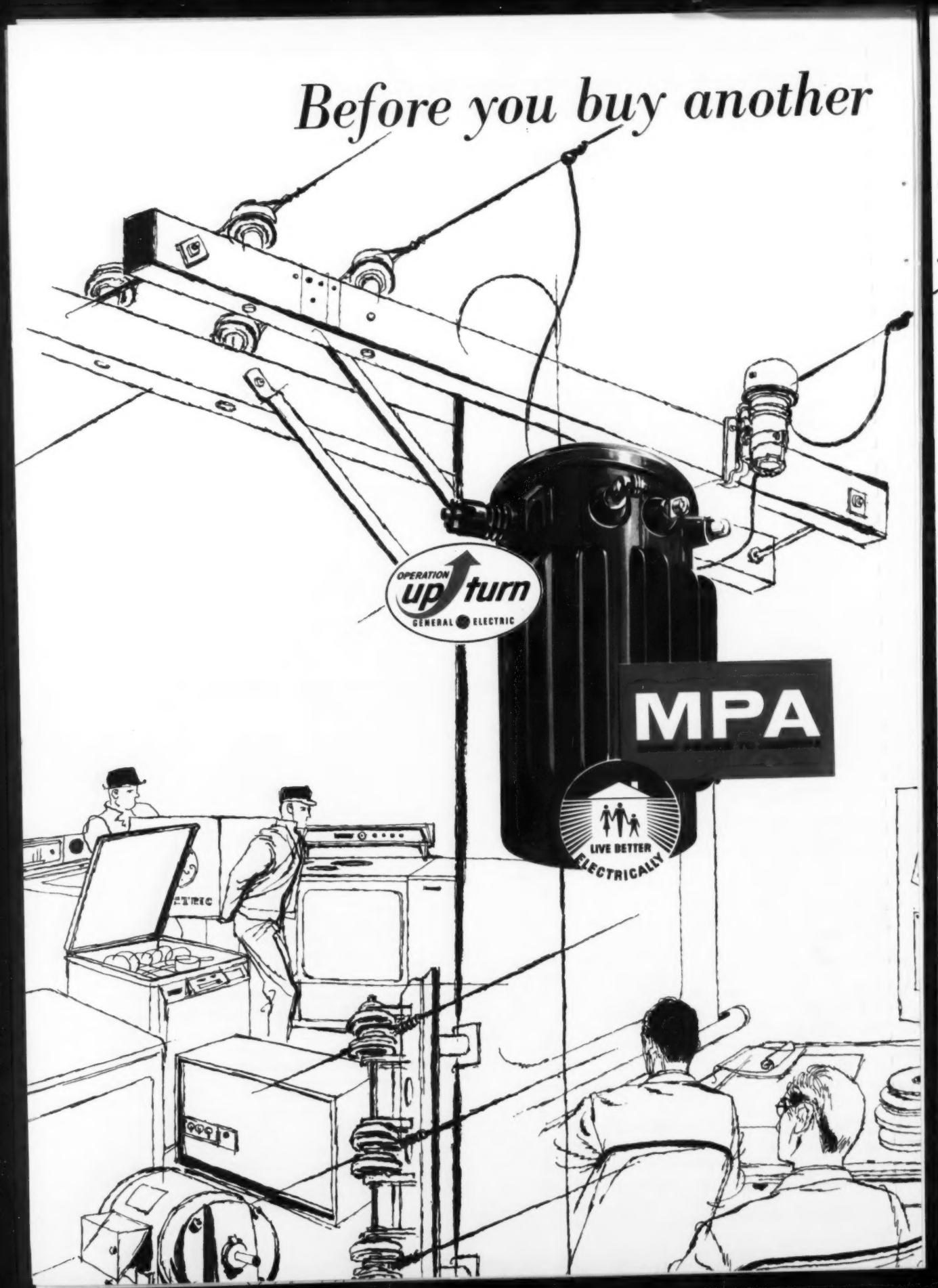
- Generators
- Synchronous condensers
- Power transformers
- Instrument transformers (accuracy tests on units rated higher than 15 kv)
- Generator-type regulators
- Induction and step regulators
- Switchboard instruments
- Watthour meters
- Bushing-type current transformers
- Relays
- Oscillographs
- Line Structures
- Stations (ground-resistance tests)
- Oil circuit breakers
- Lightning arresters
- Stationary auxiliary power transformers
- Control cables
- Power cables
- Control wiring

Routine Tests Are Made at Specific Intervals

(Types of tests are given for major apparatus)

EQUIPMENT	TEST INTERVAL (Months)
Generators and Synchronous Condensers	
Dielectric-absorption tests using a motor-driven tester at both 500 and 2,500 v on stator. On main field and exciter only 500 v is used	12
Voltage-drop tests on main field to check for shorted turns	12
Resistance tests on stator and main field	12
Resistance tests on bearing insulation	12
Slot-discharge and corona tests	48
Governor-performance tests	12
Checks of temperature, vibration, and other recorders	12
Vibration measurements initially and after repairs	12
Hi-pot tests initially and after stator winding repairs. Dc is usually used	12
Regulator tests	12
Power Transformer, Step and Induction Regulators	
Ratio tests on all taps except where taps are internal	24
Resistance tests of all windings or all taps except where taps are internal	24
Insulation resistance tests	24
Doble tests on windings and on bushings that have test facilities built in	36
Dielectric tests on oil. Interfacial-tension and neutralization-number tests are usually confined to free-breathing transformers	24
Check fan and pump controls	24
Regulator Controls: Generator, Step, and Induction, Oil Circuit Breakers, 14.4 kv and higher	12
Power factor tests	36
Oil Circuit Breakers	
Doble tests on units rated 12 kv and higher	12
Timing tests	12
Contact-resistance tests	12
Functional checks of all control devices	12
Oscillographs	
Check operation and optical system	1
Change lamp	1
Battery inspection	12

EQUIPMENT	TEST INTERVAL (Months)
Bushing-type Current Transformers	
Insulation tests on secondary	36
Saturation tests	36
Relays	
Visual inspection of distance and carrier	6
Electrical-calibration tests of all types	12
Instrument Transformers, 44 kv and higher	
Doble tests	—
Dielectric test on oil	—
Station Ground Mats	
Ground-resistance tests	36
Tests to determine that all apparatus is tied to ground mat	36
Switchboard Graphic Instruments	
Calibration tests	12
Replace motor-drive clock	60
Replace escapement-type clock	24
Clean pens	1
Other Switchboard Instrument Calibration	48
Revenue Watthour Meter Calibration	
Self-contained, polyphase	12
Self-contained, single-phase	60
Transformer-type, single-phase	12
Others	36
Statistical Watthour Meter Calibration	
Gross generation at major steam plants	6
Single-phase	60
Others	12
PD Demand Meter Replacements	
60-min-interval, active mechanism	72
30-min-interval, active mechanism	36
In active mechanism, infrequent or no operations	108
Graphic Watthour Meter Clocks	
General Electric with Telechron motors	36
Westinghouse motor oiling	30
Westinghouse motors replaced	60


Before you buy another
OPERATION
up turn
GENERAL ELECTRIC
MPA
LIVE BETTER
ELECTRICALLY

transformer... MEASURE LOAD BUILDING

General Electric programs and products put load on your line

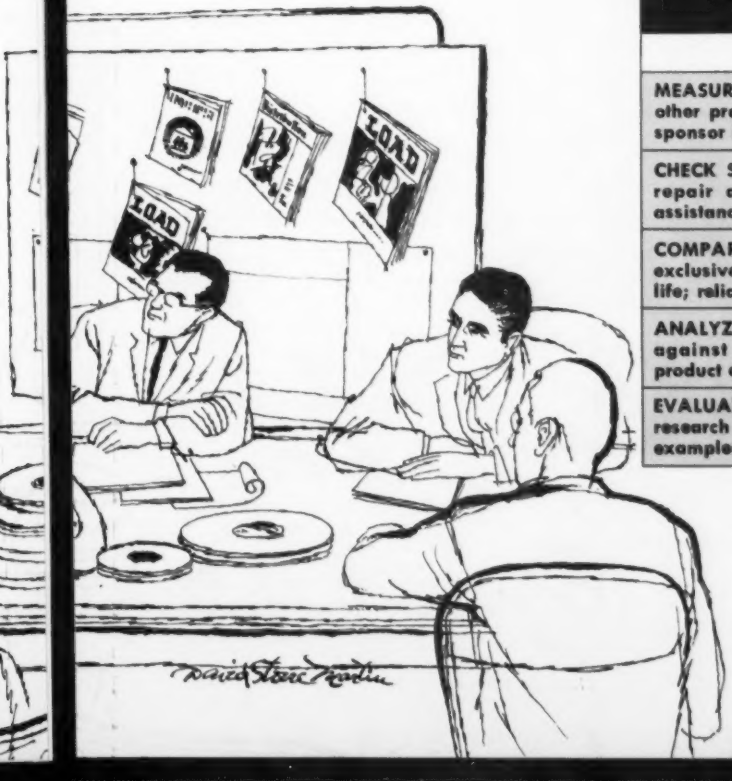
For every distribution transformer you purchase from General Electric, almost a dollar is invested in More Power to America, Live Better Electrically, Operation Upturn, and in other industry-wide load-building and adequate-wiring programs.

General Electric sells two dollars' worth of equipment to *consume* electric power for every dollar's worth sold to *produce* electric power. And you get the load built by these power-consuming products, ranging from home appliances to giant furnaces for industry. So General Electric products as well as programs build load.

Before you buy another distribution transformer, measure load-building activity—give your transformer manufacturer credit for the extra values he gives you. General Electric Company, Schenectady 5, New York.

Progress Is Our Most Important Product

GENERAL ELECTRIC



GIVE YOUR TRANSFORMER MANUFACTURER CREDIT FOR THE EXTRA VALUES HE GIVES YOU

		G.E.	OTHER MFGRS.			
MEASURE LOAD BUILDING—do Co.'s other products build load? Does Co. sponsor load-building programs?						
CHECK SERVICE—24-hour shipment? repair and uprating? emergency assistance?						
COMPARE FEATURES—how many exclusive features in terms of longer life; reliability; easy maintenance?						
ANALYZE PRICE—does Co. hold line against inflation with significant product developments?						
EVALUATE INNOVATIONS—has Co.'s research paid off for you? Recent examples?						

FILL IN THE BLANKS . . . See which manufacturer gives you more for your transformer dollar: Mark "X" for a measurable contribution, "O" for insignificant contribution.

GE Introduces Interchangeable Bushing Line

"TBI" bushings, recently introduced by General Electric Co, feature interchangeability between transformers and circuit breakers in the standard voltage classes from 23 to 196 kv. They also meet ASA standards.

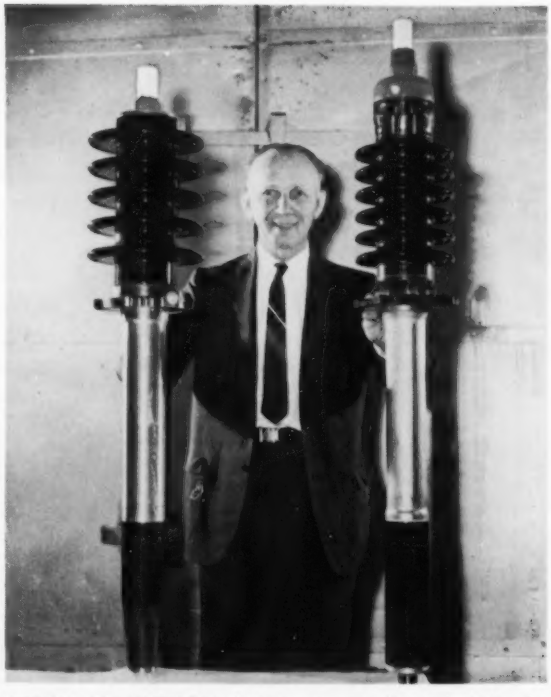
Only eight basic bushings of the new Transformer-Breaker Interchangeable (TBI) line are required. For the same voltage range, ASA Standards (C76.1a-1958) provide 37 bushings. From 23 to 69 kv, 4 bushings are designated as transformer and circuit breaker bushings and 20 for transformers only. From 92 to 196 kv, 6 bushings are designated interchangeable and 7 are for transformer use only. Principal benefit of interchangeability is considered to be the potential savings in spare bushing inventory requirements. Other advantages are: Better service in case of emergency; simplification of ordering and stocking; and the prospect of continued low-price levels derived from large-volume manufacturing. For a circuit breaker application, see p. 86.

Key to the bushings' interchangeability is their dual current rating: 400/1200 amp in the 23-69 kv range and 800/1600 amp in the 115-196 kv range. Current rating is determined by terminal accessories, connected to hollow conductors. To convert from one application to the other, all that is required is to change the accessories, e.g., for breakers, bushings can be connected at the bottom to the breaker interrupter, and in transformers, the transformer draw lead can be pulled up through the hollow conductor and connected at the top.

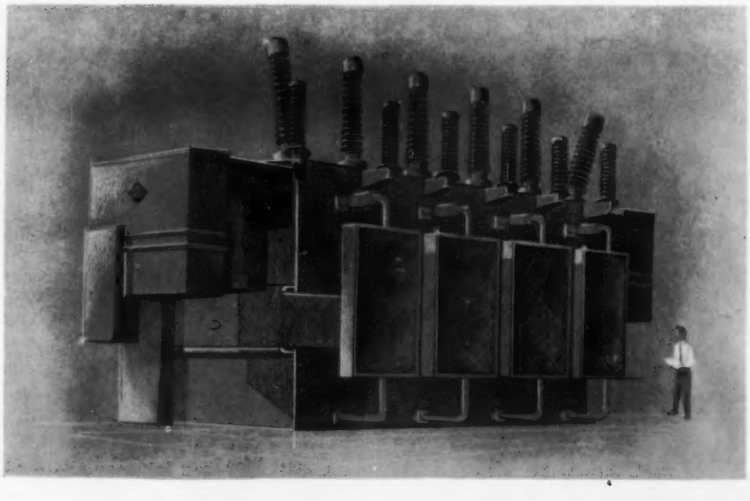
The design includes an oil impregnated, lined paper core with voltage stress equalizers in the form of Rescon lines printed on the paper. This equalizes radial voltage stress, reducing size and weight of the bushings, and permitting the use of the hollow conductors within ASA standards.

An addition for smaller sizes of these bushings is a thick-walled glass expansion chamber which, being transparent, affords ready visibility of the liquid level.

The new type bushings can be specified for GE power transformers, medium transformers, and high-voltage circuit breakers by the first quarter of 1959.



TYPICAL TBI BUSHING (right), of GE's line of eight, for either transformers or breakers, replaces Type LC (left)



Top Capacity Transformer Designed For Small Space

A transformer which will have an equivalent two winding capacity of 404,250 kva is being built by Allis-Chalmers Mfg Co, Milwaukee, Wis., for Commonwealth Edison's Crawford Station. The 660,000-lb unit (see accompanying sketch), believed by Allis-Chalmers to be the largest transformer on order to date, is being designed to fit the limited space available between two buildings. The unit will be about 40 ft long, 18 ft wide, and 21 ft high.

The low-voltage winding on this three-phase transformer is 385 Mva

(Continued on page 74)

In Baltimore . . .

MONOTUBE POLES for the giant Harbor Tunnel Expressway Project

For exceptional appearance, design choice, maximum life and maintenance economy, specify Union Metal MONOTUBE lighting poles.

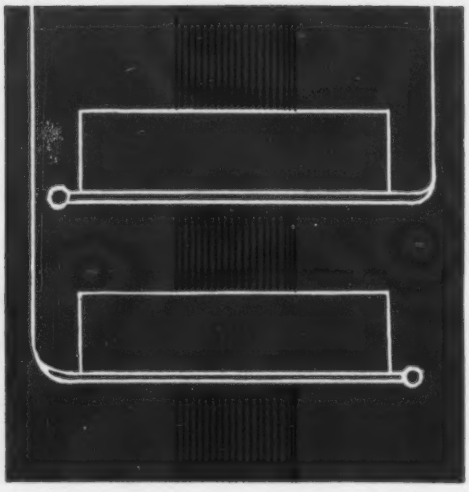
Steel or aluminum . . . round or fluted . . . davit or bracket type design . . . anchor or transformer base . . . Union Metal's half-century of experience is your guarantee of complete satisfaction.

Catalog information is readily available. Write The Union Metal Manufacturing Company, Canton 5, Ohio. In Canada: The Union Metal Manufacturing Company of Canada Limited, Brampton, Ontario.

UNION METAL

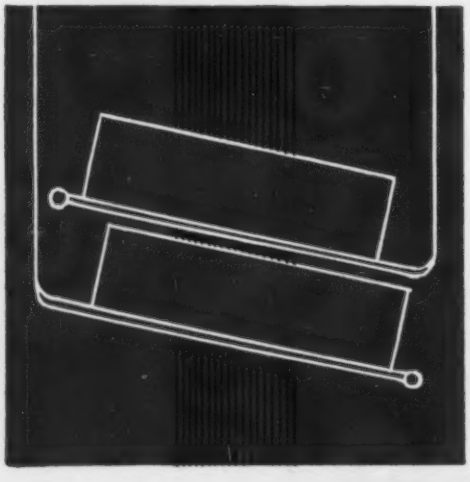
Monotube Lighting Poles

Modern Monotube davit lighting poles and overhead sign supports help speed traffic and reduce accidents along Baltimore's new 17 mile – 130 million dollar expressway system.

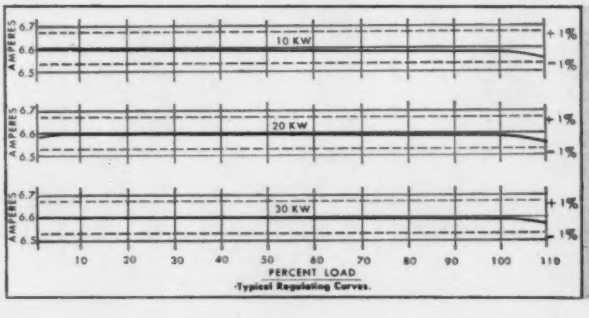


The exclusive Moloney double-moving-coil design under approximately half-load condition. (Note parallel position of coils.)

ONLY MOLONEY OFFERS THE DOUBLE-MOVING-COIL CONSTRUCTION



Under full load conditions the coils move to this position. Notice that the coils are parallel to each other under this or any loading condition.



Typical Regulating Curves.

Typical regulation curves. Excellence of regulation is due to the use of a well-balanced electrical design, together with Moloney's *double-moving-coil construction.*

This exclusive external adjusting mechanism permits current adjustment without removing hand-hole or transformer cover . . . seven positive-stop positions.

MOLONEY ELECTRIC COMPANY

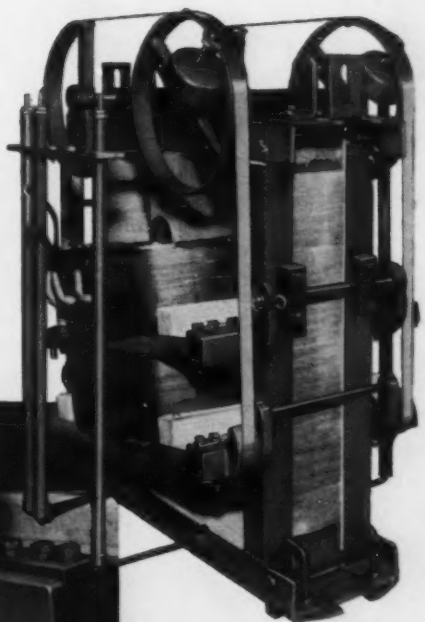
Manufacturers of Transformers for Utilities, Industry and Electronic Applications

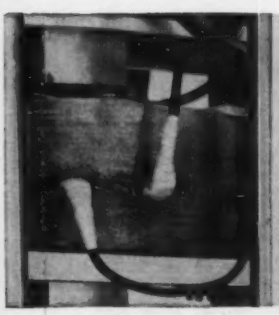
EXCLUSIVE ADVANTAGES OF IN *Constant Current Transformers...*

This exclusive feature permits quicker response with less severe shocks due to short circuit conditions. Each coil pivots in response to circuit changes to move closer together or farther apart and the coils are *always* parallel to each other. The end result is a superior regulation curve.

In addition to this exclusive feature Moloney Constant Current Transformers also offer the following construction features and operating advantages.

ME87-21





Flexible coil leads facilitate faster movement of the coils and minimizes the possibility of service interruptions due to lead breakage.

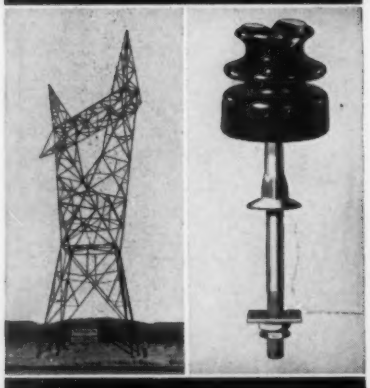
All moving parts, including coil supports, are fitted with precision ball bearings to insure free movement.

Write for Bulletin No. SL703

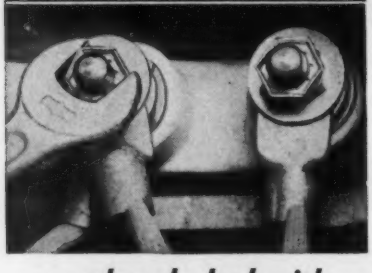
FACTORIES AT ST. LOUIS 20, MISSOURI AND TORONTO, ONTARIO, CANADA

Sales Offices in All Principal Cities

Assemblies stay tight!



Connections stay tight!



—when locked with

PALNUT LOCK NUTS

FOR years, PALNUTS have been the standard lock nuts of the utility industry—on steel towers, wood pole hardware, connectors, disconnects, switches, fittings, transformers, etc. Here's why: PALNUT Lock Nuts stay tight under severest vibration, are very low in cost, apply fast and easily, require little space. Available in full range of sizes, in plain, Parkerized and Hot Dip Galvanized steel; also silicon bronze.

Samples and literature on request.

THE PALNUT COMPANY
51 Glen Road
Mountainside, N. J.

PALNUT
TRADE MARK
LOCK NUTS
for quick, secure fastening at low cost

Top Capacity Transformer *(Continued from page 70)*

at 12,600 v. It has two high-voltage windings, each rated at 211,750 kva, which will feed two 138-kv systems. Each high-voltage winding has plus or minus 10% load-tap changing equipment, which will be installed before leaving the factory. Bushings and Electro-cooler units will be removed for shipping. The unit will be forced-oil-cooled with oil-to-air heat exchangers.

The transformer is scheduled for shipment to Crawford Station's Unit No. 8 in 1960.

Neoprene-Lined Sheaves Undergo Tests

Sherman & Reilly, Inc., Chattanooga, Tenn., designed and fabricated the machine shown above for testing Neoprene linings in conductor stringing sheaves. Test simulates actual stringing conditions, employing wire rope pulling lines.

Loading beam arrangement is used to apply a load in the sheave groove and the idler sheave is adjustable to apply tension. A ⅝-in. wire rope is run continuously at 300 ft per minute.

Length of life of the various liners tested was determined by number of miles of wire rope passing through the sheave groove. S&R's new Type GNA Neoprene liner has currently run over 450 miles under load, with no noticeable wear, according to the company. Additional testing in the field on actual stringing jobs back up these laboratory tests. Such results are an achievement for the company, in contrast to the initial run of the conductor stringing sheave testing machine, when the material failed after only three miles of wire rope had traveled through the sheave.

Canada Manufacturing Goes Over Billion Dollars

Electrical manufacturing industry of Canada has passed the billion-dollar mark for the third year in a row with total domestic production of $1.222 billion in 1957. This was reported by the newly elected president W. I. Turner at the 14th annual meeting of the Canadian Electrical Manufacturers Association.

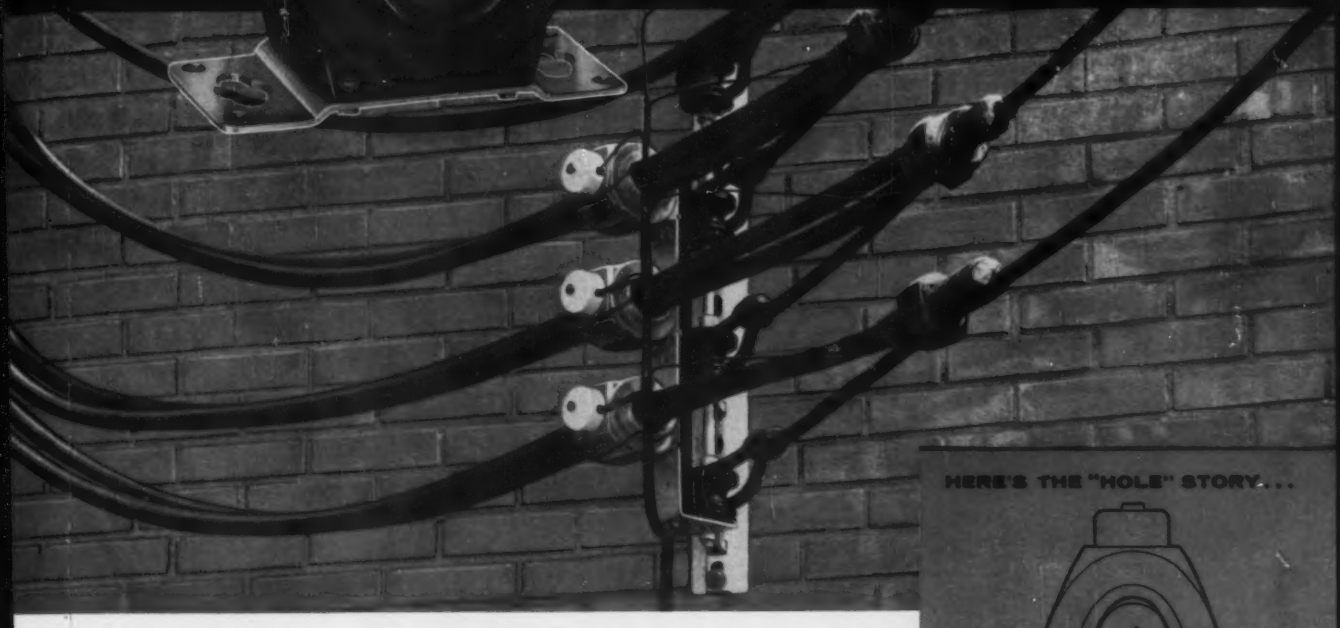
"Barring some unforeseen problem," Turner said, "the industry should maintain its strong economic position in the years to come, with another good production year expected to result when figures are complete for 1958."

The industry's 1957 production figure includes some $147 million worth of washing machines, electric driers, porcelain insulators, and other similar products. These prod-

(Continued on page 76)

COLOR-CODED
Transformers are encapsulated in colored epoxy resin to readily indicate ampere range.

NEW SANGAMO Type BH* 600 VOLT INDOOR-OUTDOOR CURRENT TRANSFORMER



200-400-600-800 AMPERES

and with new DUAL RANGE 200/400 amp feature

The new Sangamo BH-6 current transformer gives many extra values over previous designs. The *dual range feature* sharply reduces the number of costly transformer change-outs —meets the 0.3 accuracy class on all loads from 20 to 800 amperes. The *oval-shaped window* combines the advantages of both round and obround type—has greatest usable opening of any 600 volt current transformer.

Compact design—more than 40% smaller than smallest similar 200 amp. model, is easier to mount, and is the lightest transformer in its class—only 5½ pounds.

All hardware is of durable stainless steel. Type BH transformers are available in flat-bar and window type construction. Get full details—write for Bulletin 503.

CERTIFICATE OF TEST

A certificate of factory test is supplied with all current transformers. This means that every Sangamo transformer is tested thoroughly before shipment . . . arrives ready for you to put on the line.

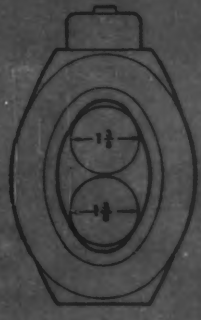
*Big Hole

SANGAMO Electric Company

SPRINGFIELD, ILLINOIS

SM58-6

HERE'S THE "HOLE" STORY . . .



Sangamo's exclusive oval opening gives greater flexibility in application. It will take two 750 MCM conductors with 600 volt insulation, or . . .

by utilizing the large center of the oval, will accommodate one insulated 1250 MCM conductor.

I wish we had more personnel and time to prepare this study for a new power plant and site.

Your regular staff is overloaded now. Call in the specialists and let them carry the peak load. How about Pioneer?

Give your non-routine operations to Pioneer

Design and Consulting Engineering Services. Pioneer has specialized in designing power plants for 56 years. It offers design service for fossil fuel, hydro and atomic plants. It will also assist in forecasting load growth, in site selection, in purchasing and expediting of equipment and in supervising construction. Pioneer's other services include substation, transmission and distribution studies and design.

Services in Regulatory Matters. Pioneer offers its services in all phases of Federal, State and Local regulation including the rate base, depreciation analysis, cost of service studies, market analysis, certificate proceedings and rate of return.

Corporate Services. Pioneer's services in corporate matters include business and management engineering advice, financial, accounting and tax counsel and insurance and pension plans and programming. It maintains a complete stock transfer, ledger and dividend disbursement service.

NEW!

On your letterhead, write for 40-page booklet, "Pioneering New Horizons in Power". Describes Pioneer's engineering services, and corporate services, from financing to operation.

56 YEARS

Pioneer Service & Engineering Co.

231 SOUTH LA SALLE STREET, CHICAGO 4, ILLINOIS

Canada Manufacturing

(*Continued from page* 74)

ucts are manufactured by the industry but classified by the Dominion Bureau of Statistics under other industries.

Turner, who is also president of Canadian Controllers Limited, added that the electrical manufacturing industry is maintaining its position as one of Canada's largest industries in terms of numbers of employees and wages paid. "In 1957," he said, "the industry employed 81,200 persons as against 83,300 in 1956, but the industry's wage and salary bill for 1957 rose to $321 million from $310 million the year previous.

S & C Type SM Power Fuses Increase Ratings 33%

Redesign of Type SM power fuses, for the purpose of matching the higher system faults of today's transmission and distribution systems has been announced by the S & C Electric Co, Chicago, Ill. The design change incorporates a new principle in the use of boric acid as an interruption medium, but does not alter any of the basic characteristics of the fuse.

The new ratings are as follows: 1,000 Mva at 34.5 kv; 750 Mva at 23 kv; and 500 Mva at 14.4 kv.

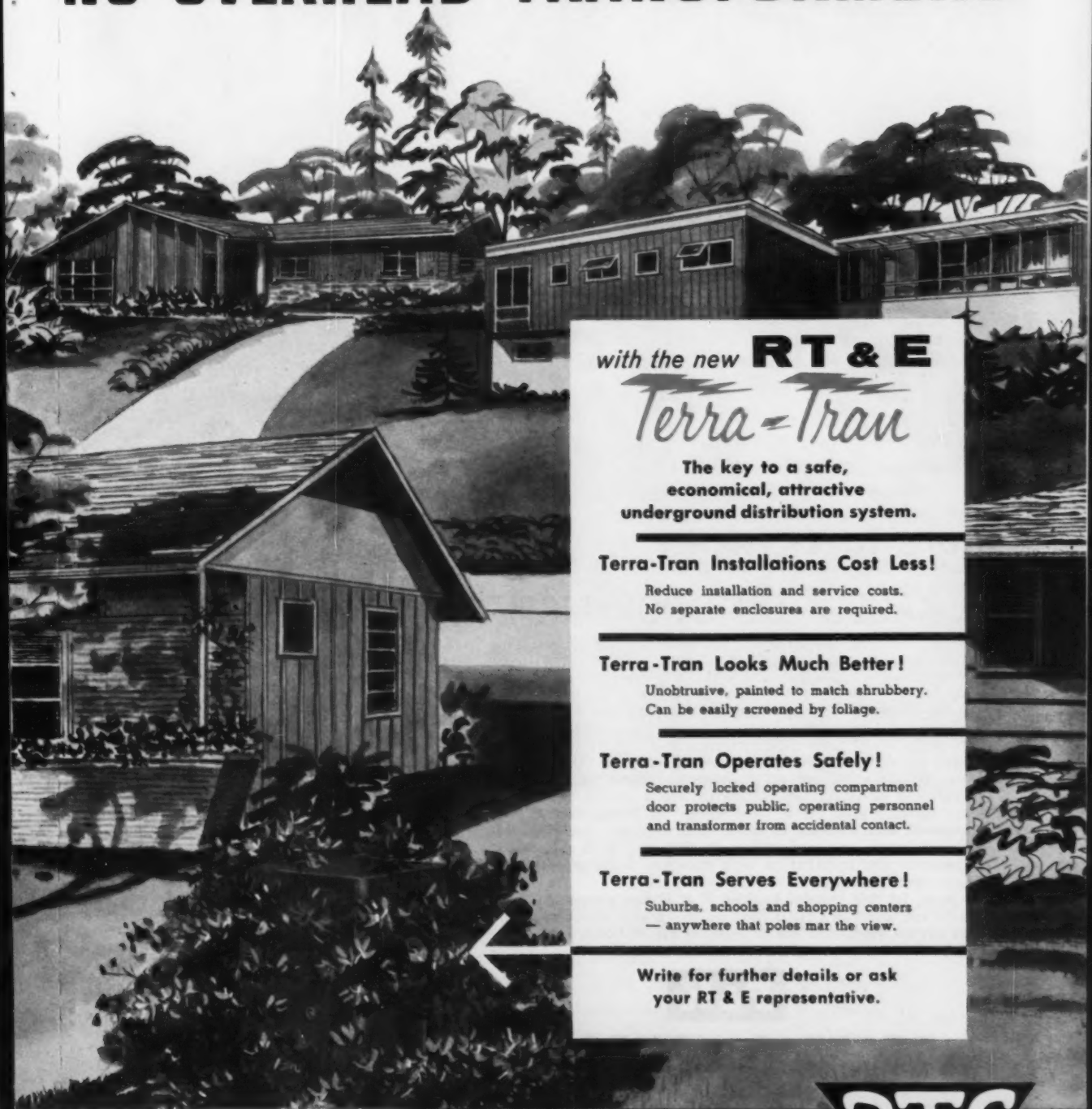
Increases in interrupting capacity have made the new ratings, fully tested and in production, higher at the same voltage. For example, the 34.5 kv fuse formerly interrupted 750 Mva, and with its new rating, 1,000 Mva at 34.5, is 33% higher. Other increases are approximately the same percentage.

Tubeless Lighting Control Proven by 7,000 Tests

A line of tubeless photoelectric lighting controls, designated Series 6600 A, is in production by Fisher-Pierce Co, South Braintree, Mass. Each unit has a cadmium sulphide photoconductive cell which operates a relay and is protected from direct sunlight. Directional operation, weatherproof plastic case, three-prong twistlock plug, and various

(*Continued on page* 78)

NO POLES NO EXPOSED LINES
NO OVERHEAD TRANSFORMERS



with the new **RT & E**

Terra-Tran

The key to a safe, economical, attractive underground distribution system.

Terra-Tran Installations Cost Less!

Reduce installation and service costs. No separate enclosures are required.

Terra-Tran Looks Much Better!

Unobtrusive, painted to match shrubbery. Can be easily screened by foliage.

Terra-Tran Operates Safely!

Securely locked operating compartment door protects public, operating personnel and transformer from accidental contact.

Terra-Tran Serves Everywhere!

Suburbs, schools and shopping centers — anywhere that poles mar the view.

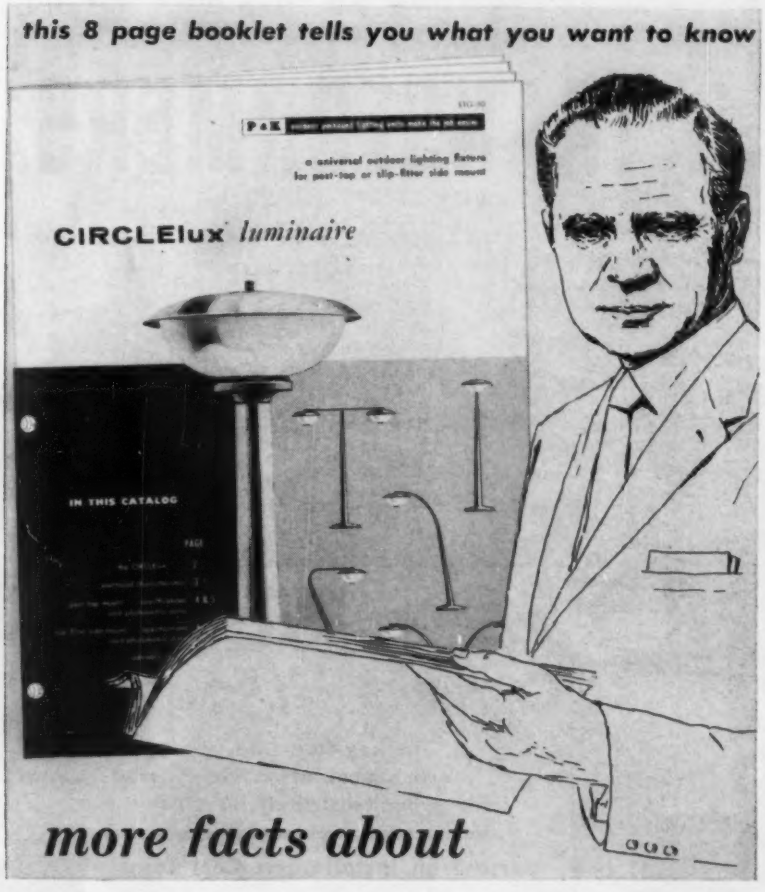
Write for further details or ask your RT & E representative.

ENGINEERING TALENT CONCENTRATED ON ONE IDEA — A BETTER TRANSFORMER

RT&E CORPORATION

WAUKESHA, WISCONSIN • PORTLAND, OREGON

Z


this 8 page booklet tells you what you want to know
P&K
a universal outdoor lighting fixture
for post-top or slip-fitter side mount
CIRCLElux luminaire
IN THIS CATALOG
more facts about

"PACKAGED" OUTDOOR LIGHTING

Having created a new concept in outdoor lighting with the development of "packaged" units P & K now brings a wealth of new information to the field. Basically, a "packaged" unit is one in which both standard and lighting unit are supplied together by the same manufacturer. The advantages are obvious: simplification of ordering and specifying, reduced shipping and handling costs, ease of assembly and installation. What's most important, however, is the fact that these handsome all-aluminum standards are available in straight and davit styles, in a wide range of sizes, and can be obtained with a choice of three light sources – incandescent, fluorescent or mercury vapor. In this way it is possible to customize any installation with standard units assembled to your specifications.

Now, in this helpful booklet P & K has provided all the facts you want on CIRCLElux units–catalog numbers, lighting curves, electrical characteristics, etc. Write for your copy of LTG-30 today.

P&K

PFAFF & KENDALL

84 FOUNDRY STREET, NEWARK 5, N. J.

Lighting Control

(*Continued from page* 76)

mountings are provided.

Manufacturer advises that about 7,000 experimental models have been in field operation since 1956. This development work resulted in this series of compact controls.

Substation Enclosures Have Aluminum Construction

Decorative aluminum enclosures for substations are now obtainable from Hi-Voltage Equipment Co, Cleveland, O., a division of Joslyn Mfg and Supply Co. The fencing uses Aluminum Co of America material.

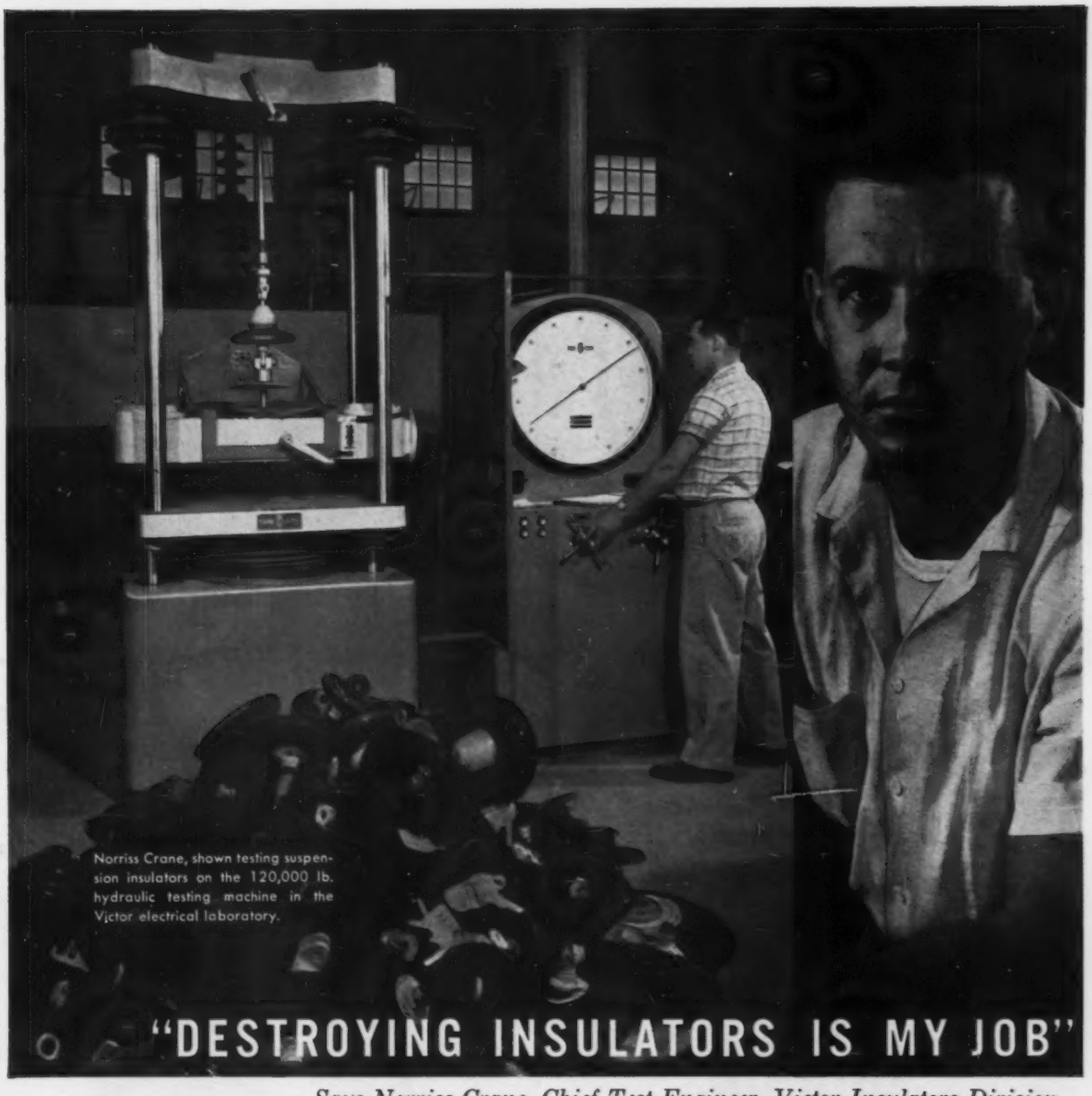
When Hi-Voltage came out with enameled steel enclosures (E.W., Aug. 25, p 74; Sept. 15, p 74), utility leaders expressed enthusiasm. Upon further consideration, aluminum enclosures were included as part of the manufacturing program, because of low maintenance cost.

One-Piece Weathercasings Made for 345-kv Bushings

The first one-piece 345-kv bushing weathercasings from the Westinghouse Electric Co's porcelain plant in Derry, Pa., was received recently by the company's power circuit breaker department.

These weathercasings, among the largest electrical porcelain pieces

(*Continued on page* 82)



Norriss Crane, shown testing suspension insulators on the 120,000 lb. hydraulic testing machine in the Victor electrical laboratory.

Says Norriss Crane, Chief Test Engineer, Victor Insulators Division, I-T-E Circuit Breaker Company

"The VICTOR insulators that go on your lines will never have to take the mechanical and electrical loading we give them in the VICTOR laboratory. Here, these insulators are subjected to stresses far in excess of the EEI-NEMA Standards. In fact, our continuous quality control testing program shows that VICTOR insulators proof-test at values as much as twice their EEI-NEMA ratings. Such a margin of safety precludes insulator failure on the line."

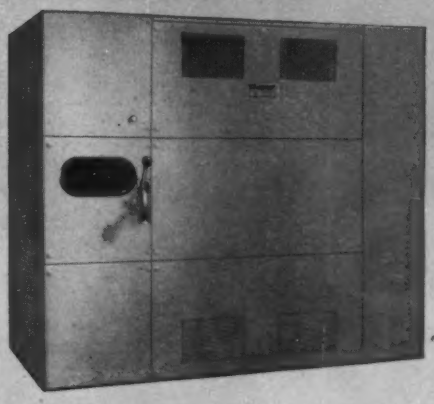
When you buy VICTOR, you buy practically twice the insulator you pay for. That's why we say: "*VICTOR is the power man's best bargain.*"

I-T-E CIRCUIT BREAKER COMPANY, INC.
VICTOR INSULATORS DIVISION
Victor, New York

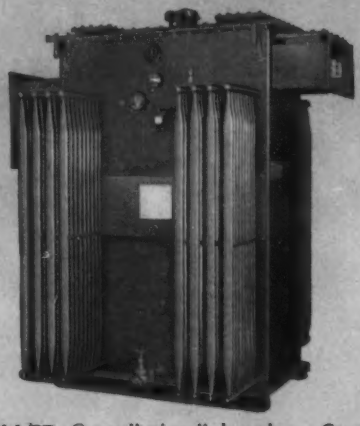
Wagner

UNIT SUBSTATION TRANSFORMERS

112½ to 2000 Kva—three phase, 60 cycles, 15 KV and below



VENTILATED DRY-TYPE—For indoor installation in reasonably dry, dust-free, well ventilated locations. Light in weight, ideal for multi-story buildings. No fire-proof vaults required. Insulated for 80°C temperature rise.

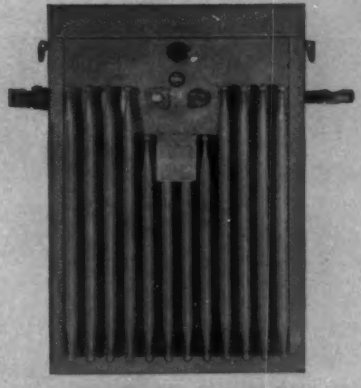


OIL-FILLED—Generally installed outdoors. Can be used indoors in fire-proof vaults. Outdoor transformers can be connected to indoor switchgear using weather-proof bus-duct. 55°C rise, self-cooled or forced-air cooled.

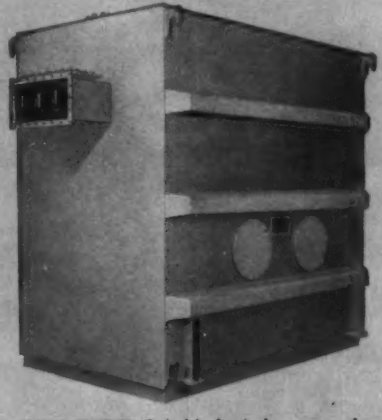
When you select a Wagner Transformer...

YOU GET THE TYPE FOR YOUR PLANT

PLUS... the assurance of continuous,



NOFLAMOL—Non-inflammable liquid filled. For indoor or outdoor installation, especially suited for chemical plants, refineries and similar locations where explosive liquids or gases are present. The close-coupled design illustrated fits flush against switchgear enclosures. Throat connected designs are also available. 55°C rise, self-cooled or forced-air cooled.



SEALED DRY-TYPE—Suitable for indoor or outdoor use, completely fire-proof, easy to clean and maintain. Sealed tank is filled with nitrogen under low pressure. Insulated for 150°C rise, self-cooled.

WAGNER ELECTRIC CORPORATION

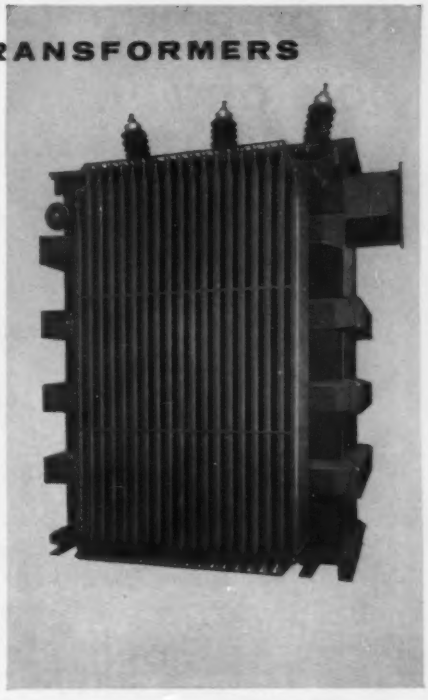
WT58-16

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES • AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC

Wagner **INDUSTRIAL POWER TRANSFORMERS**

Oil-filled, through 10,000 Kva, 67 KV and below.

Noflamol, through 7,500 Kva, 15 KV and below.



IF YOU are planning a new plant distribution system ... modernizing your present one ... or adding to its capacity to meet increasing demands for power ... it will pay you to specify Wagner Transformers.

For your main plant substation, Wagner Liquid Filled Industrial Power Transformers are available in standardized ratings through 10,000 Kva.

For your load centers, Wagner can supply Unit Substation Transformers in any of the types shown at the left, furnished with suitable incoming line sections, to meet your particular requirements. These PREDESIGNED transformers will save you time and save you job engineering costs. You can specify the secondary switchgear you prefer.

BEST SUITED ELECTRICAL SYSTEM ...

dependable service!

For plant areas requiring 120/240 volts, single-phase or 208Y/120 volts three-phase, Wagner Dry-Type Distribution Transformers are an economical choice.

All Wagner Industrial Transformers are liberally designed, sturdily constructed, thoroughly tested and able to meet the heaviest industrial demands. They assure continuous, dependable power for years to come.

For expert advice on your present and future plant transformer needs, call or write the Wagner branch near you.

Wagner Electric Corporation
6456 PLYMOUTH AVENUE, ST. LOUIS 14, MO., U. S. A.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

Wagner **DRY-TYPE DISTRIBUTION TRANSFORMERS**

Single-phase 1 to 100 Kva—Three-phase 3 to 300 Kva—600 volts and below

Type AE, single-phase, 1 through 50 Kva, and Type AP, three-phase, 3 through 30 Kva, can be used for indoor or outdoor installation, larger ratings for indoor installations only. Ratings through 10 Kva single-phase and 30 Kva three-phase are designed for wall mounting, other ratings for floor or platform mountings.

Available for high voltages of 120 X 240, 240 X 480, 480 and 600 volts to 120/240 volts single-phase, and 480 and 600 volts to 208Y/120 volts three-phase.

To prevent pole and power line leaning...

guy with

CF&I GALVANIZED STEEL STRAND

Whether it is an installation involving exposure to the corrosive action of acrid industrial fumes or to severe storms—public utility linemen know that CF&I Galvanized Steel Strand will withstand rugged service.

Meticulous adherence to standards characterizes every step in the manufacture of CF&I Galvanized Steel Strand. It meets or exceeds ASTM Specifications A-122 or A-363—or, if you prefer, our Buffalo, N. Y. or Pueblo, Colo. plants will make it to your specifications in seven- or three-wire constructions. When you're in the market for top quality, guy, messenger or overhead ground wire, contact your nearby CF&I representative or your local electrical distributor.

5690

CF&I **GALVANIZED STEEL STRAND**
THE COLORADO FUEL AND IRON CORPORATION

Albuquerque • Amarillo • Atlanta • Billings • Boise • Boston • Buffalo • Butte • Chicago • Denver Detroit • El Paso • Ft. Worth • Houston • Kansas City • Lincoln (Neb.) • Los Angeles • New Orleans New York • Oakland • Oklahoma City • Philadelphia • Phoenix • Portland • Pueblo • Salt Lake City San Francisco • Seattle • Spokane • Wichita. CF&I OFFICES IN CANADA: Montreal • Toronto

Weather Casings

(Continued from page 78)

manufactured, measure 102.87 in. long and 29.75 in. at the largest diameter. These one-piece units replace two-piece weathercasings in which two porcelains were mechanically assembled together into a single unit.

MANUFACTURERS BRIEFS

General Electric Co, Syracuse, N. Y., has increased by 3.7% the price on its low-band and high-band two-way mobile radio units, effective Oct. 23. The revision does not apply to its UHF equipment nor microwave or carrier current lines.

NEMA: Wire Cable Section, National Electrical Manufacturers Association, New York, has produced posters to illustrate the correct handling and movement of reels. They are designed for use in factory warehouses, on shipping docks, and for inclusion with shipments of wire and cable. Price: $0.15 for 8½x11-in. size, and $0.25 for 13¼x17-in. size.

Worthington Corp, Harrison, N. J., has shipped a 120,000-sq ft steam condenser, said to be the largest to date for nuclear power. Installation is to be made at Commonwealth Edison Co's nuclear power plant in Dresden, Ill. The unit is designed to condense 1.5 million lb of steam per hour, using 25 million gal of water per day.

For ECONOMY and SAFETY on Super Highways and Bridges

KERRIGAN ~~Weldforged~~ Standards add Strength (without weight) for LONGER SERVICE

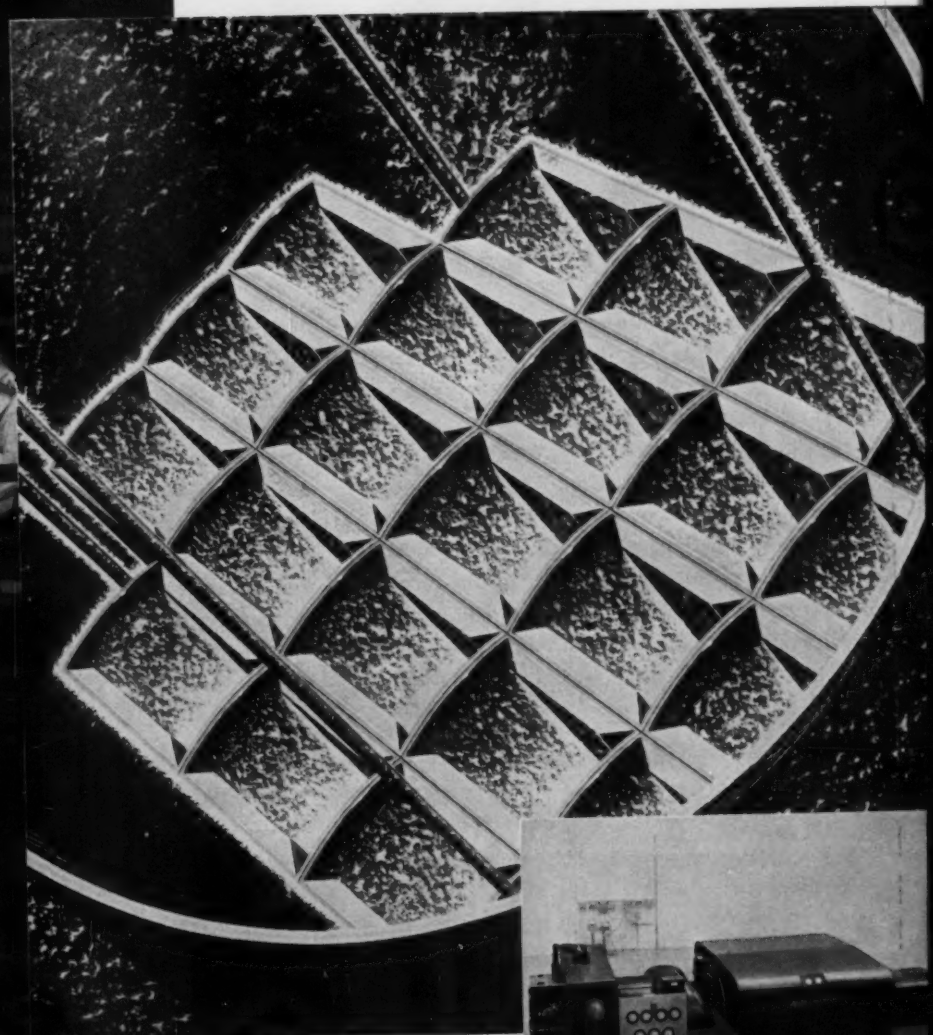
Properly planned lighting of the great new super highways and bridges will certainly save many lives. And for every type of bridge, or turnpike, there is a Kerrigan Weldforged standard. They are made of high strength, low alloy steels by the most modern methods of fabrication. Welds are tested by the MAGNA-FLUX Magnetic Particles Test to insure quality. This use of improved steels, modern fabrication methods and rigid tests means greater service from a KERRIGAN 11-gauge, low alloy steel lighting standard than can be obtained from any 7-gauge mild steel standard...with less weight, and FAR GREATER STRENGTH . . . greater resistance to corrosion and bending, too.

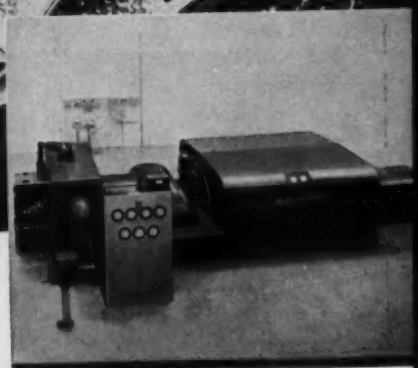
Kerrigan aluminum lighting standards are engineered and manufactured to the same excellent standards that have gained acceptance for our steel standards throughout the nation. They meet and exceed all EEI-NEMA standards. Strikingly handsome, both Kerrigan steel and aluminum continuous tapered, octagon shaped standards lend grace and beauty to any lighting installation. For complete specifications on both kinds write for free catalogs. Address: Dept. E.W.

For better lighted streets, bridges and highways the standard is Kerrigan!

KERRIGAN IRON WORKS, INC., NASHVILLE, TENN., GEN'L SALES OFC.: 280 MADISON AVE., NYC

NUCLEAR



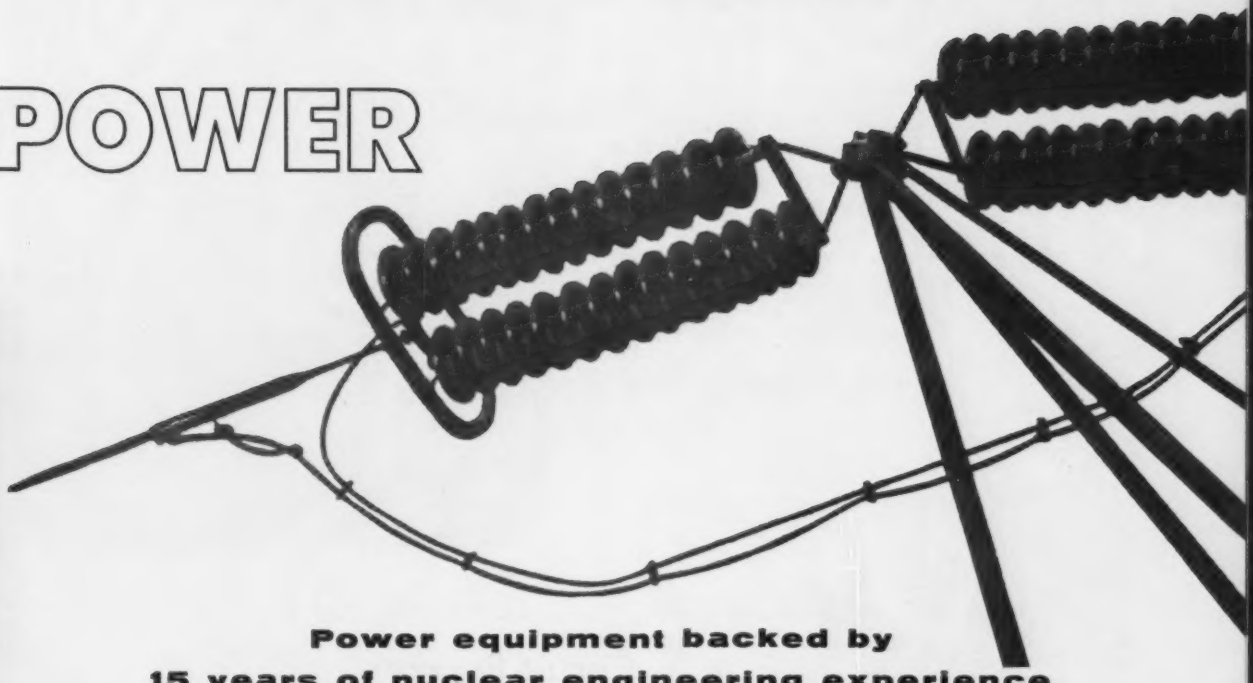


Reactors

Steam Turbine Generators

A-5790

POWER



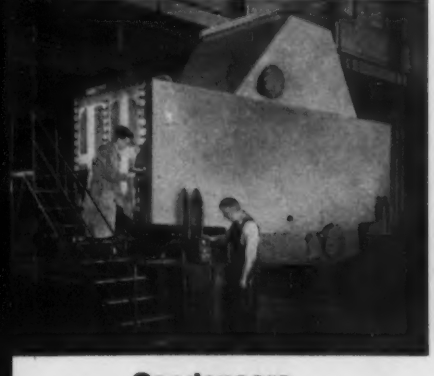
Power equipment backed by 15 years of nuclear engineering experience

ALLIS-CHALMERS development of nuclear reactors and allied equipment is a logical outgrowth of 75 years of building basic power equipment.

With nuclear experience dating back to the Manhattan Project, facilities, engineering, and production skills are being utilized to produce nuclear power equipment with the same high standards that identify A-C steam turbine generators, condensers, pumps, water conditioning equipment, control, switchgear, breakers, and transformers.

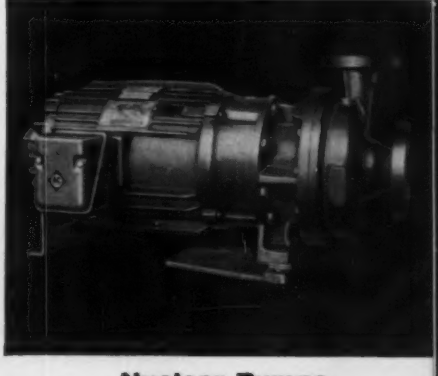
Allis-Chalmers is now engaged in the design and will construct a 66,000-kilowatt nuclear power plant* for the Northern States Power Company in cooperation with ten other electric companies.

Equipment and engineering for all nuclear power plant needs . . .



Condensers

Control and Switchgear



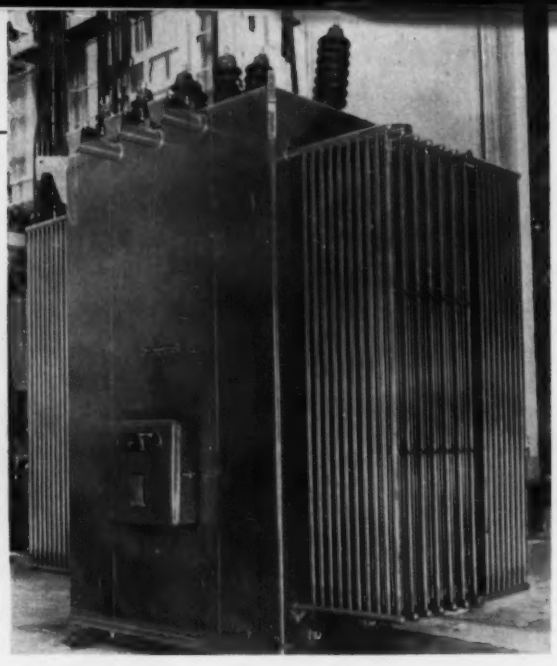
Nuclear Pumps

ALLIS-CHALMERS

*A model of a nuclear power plant using a Controlled Recirculation Boiling Reactor with nuclear superheater will be featured in the Allis-Chalmers exhibit in the United States Exhibition Area, Geneva Atoms for Peace Exhibition.

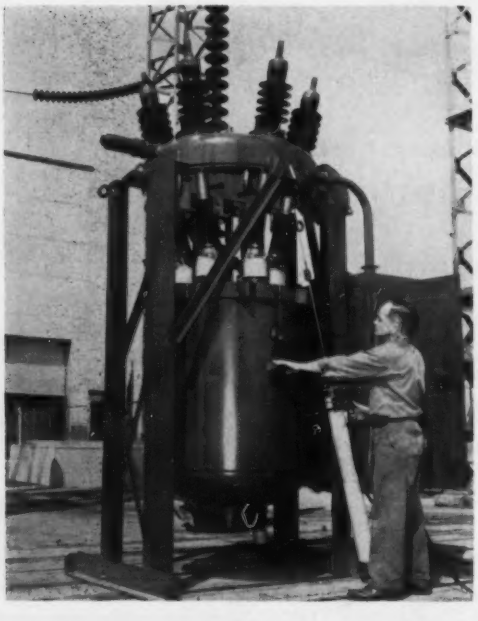
New Equipment

Substation Transformer . . .



. . . has standardized design core form. Internal, rather than external tank bracing provides a streamlined appearance. Accessories are located in a locked weatherproof cabinet at eye level. The rounded corner tank is lowered over the core and coil assembly and welded at the base. This allows core and coils to be bolted to the transformer base for rigidity and reduced untanking height and weight.

Westinghouse Electric Corp, Box 2099, Pittsburgh 30, Pa.

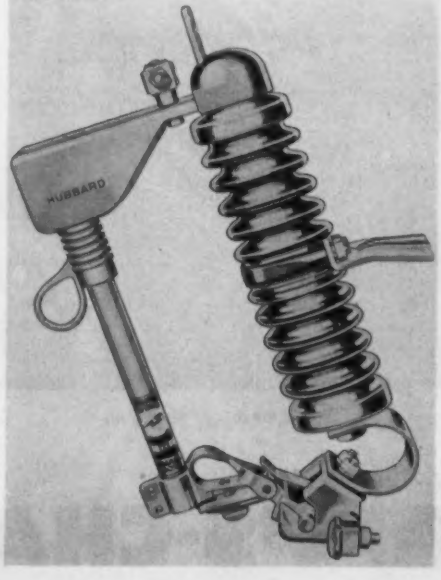


Circuit Breaker . . .

. . . for sub-transmission applications features single-tank construction and 5-cy c operating time. It also features a pneumatic tank lifter which operates from the air supply of the operating mechanism, and can be easily attached and operated by one man. The power circuit breaker utilizes Transformer-Breaker Interchangeable bushings. (See page 70.) Called Type FKA, the single tank breaker is available in ratings from 15 to 46 kv with interrupting ratings of 500 to 1,500 mva, 1,200 amp.

General Electric Co, Schenectady 5, N. Y.

Small-Bore Cutout . . .



. . . is rated extra heavy duty (10,000 amp at 5.2 and 7.8 kv, and 8,000 amp at 15 kv). It operates consistently throughout the full range from small overloads to high short-circuit currents. The single exhaust envelope discharged in a well-contained cone offers safety to personnel and equipment. A thrust-absorbing recoil design controls the thrust of the single-vent jet action and protects the cutout against mechanical damage.

Hubbard and Co, 6301 Butler St, Pittsburgh 1, Pa.

(More New Equipment on page 90)

NEW JOSLYN TYPE MV-134
RESIDENTIAL
MERCURY LUMINAIRES

FOR I.E.S. TYPE II LIGHT DISTRIBUTION

The latest design in a residential street lighting luminaire for 175-watt or 250-watt mercury vapor lamps.

A Joslyn-Holophane refractor coupled with an efficient Alzak-processed inner reflector provides a high degree of light utilization.

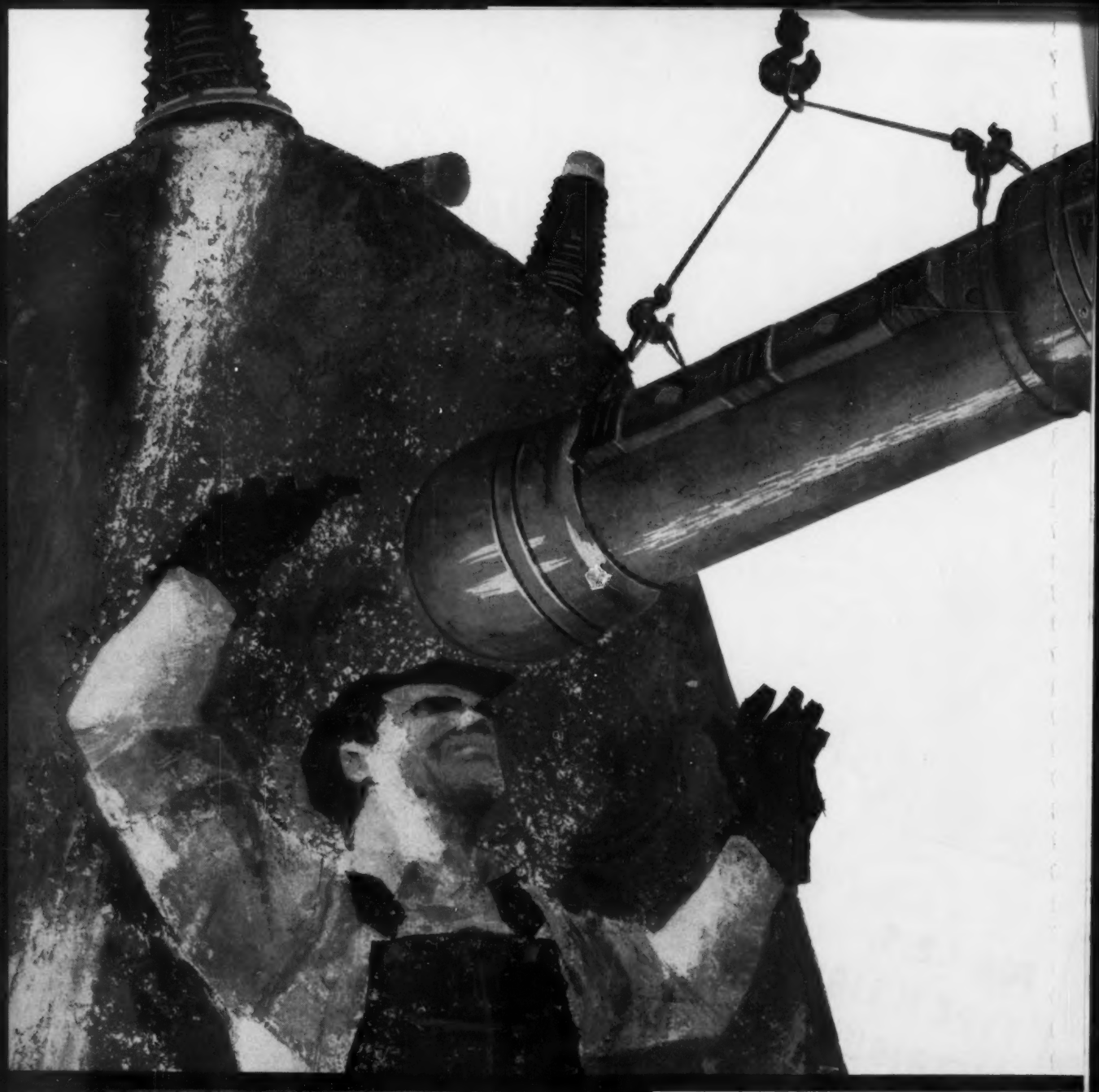
Rugged Design—Pleasing Appearance—
Easy to Install and to Maintain.

Dimensions: 18 inches long x 12 inches wide
Weight: 12½ lbs.

Order by specifying Catalog No. J134220

JOSLYN® COMPLETE POLE LINE EQUIPMENT

JOSLYN
MFG. and SUPPLY CO.
155 North Wacker Drive, Chicago 6, Ill.



Main work-aisle at the East Pittsburgh plant shows the extensive area available for building breakers to meet the demands of rapid system expansion in progress today. At rear is high-voltage test equipment to hi-pot complete breakers and components.

Tank interior reveals the ready accessibility of interrupter grids for inspection or maintenance. Without removing grids from bushing, interrupter blocks can be removed to reveal stationary fingers and moving contacts. Contacts can be replaced in tubes without loss of interrupter alignment.

HIGHER INTERRUPTING CAPACITIES THROUGH WESTINGHOUSE CIRCUIT BREAKER DEVELOPMENT

The outstanding protection provided by today's power circuit breakers is a primary factor in the growing load-carrying ability of modern electric utility systems. Their increased interrupting capacities, higher voltage ratings, faster operating time and improved electrical design all permit increased system capacities, greater system integration.

Every major advance in the art of circuit interruption during the past 50 years has originated at Westinghouse . . . result of a policy of reinvesting earnings into research and development. Here are a few important breaker design contributions:

DE-ION® TUBULAR GRIDS — providing the highest interrupting capacities and most reliable operation in all voltage ranges. In addition, these grids allow the easiest interrupter inspection and maintenance possible today.

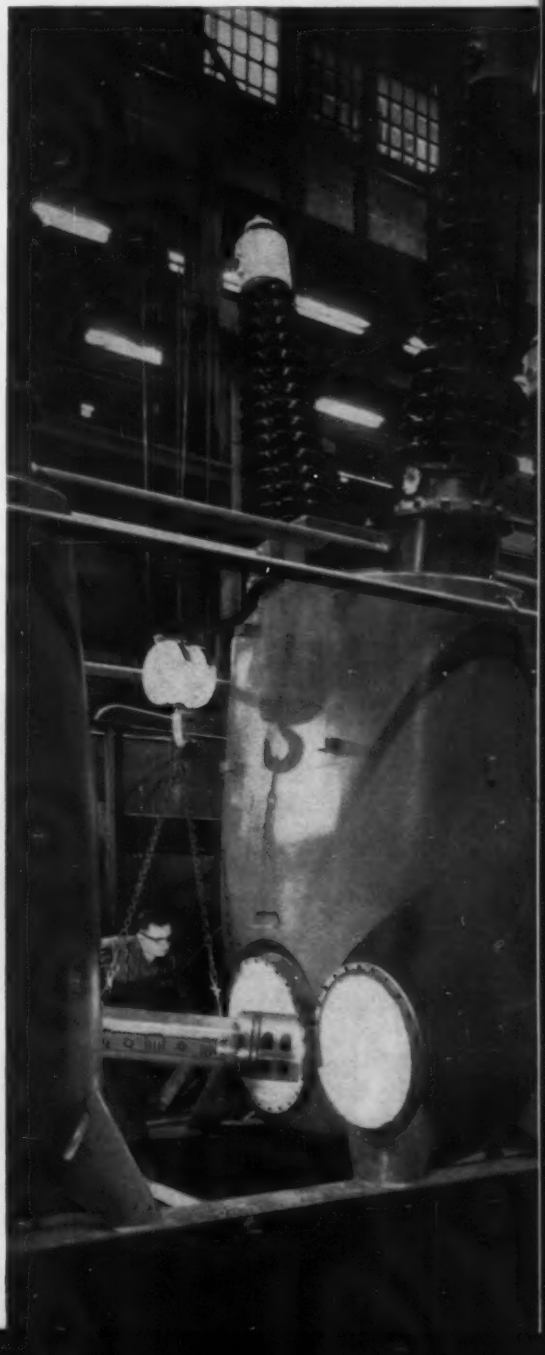
WATCH-CASE® TANKS — permitting higher voltage and interrupting ratings without a proportional increase in space. Oil requirements reduced as much as one-half with corresponding cut in maintenance costs.

CONDENSER BUSHINGS — developed over 50 years ago by Westinghouse and recently adopted by the entire industry, have proved to be the most reliable and trouble-free bushings ever designed.

Developments such as these are part of a continuing program of research and development which keeps Westinghouse ahead of your system requirements.

When planning expansion of your system capacity, call your Westinghouse sales engineer to learn how you can reduce total system investment, operating and maintenance costs. Or, write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pennsylvania.

J-60955



YOU CAN BE SURE...IF IT'S Westinghouse

Reader Service

For additional information on new products, supplies, and services in this issue, the Manufacturers Editor of Electrical World offers his facilities. Check items in which you are interested in list below:

NEW EQUIPMENT

Westinghouse .....Transformer ☐
GE .....Circuit Breaker ☐
Hubbard .....Cutout ☐
Glastic .....Insulator ☐
Burndy .....Clip ☐
Line Material .....Rack ☐
Minnesota Mining .....Tape ☐
Radio Frequency Labs....Terminal ☐
Simplex .....Insulation ☐

OTHER

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Manufacturers Editor
Electrical World
330 W. 42nd St.
New York 36, N.Y.

* Note: Requests must be received within four weeks of publication date, accompanied by complete information specified. This service cannot be offered to readers in foreign countries or to competitive manufacturers.

NAME_____

TITLE_____

DEPT._____

COMPANY_____

ADDRESS_____

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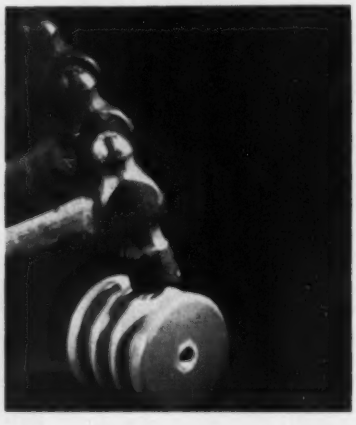
FOR:

Reference ..... ☐
Specs ..... ☐
Trial ..... ☐
Purchase ..... ☐

NOVEMBER 3, 1958

Standoff Insulator . . .

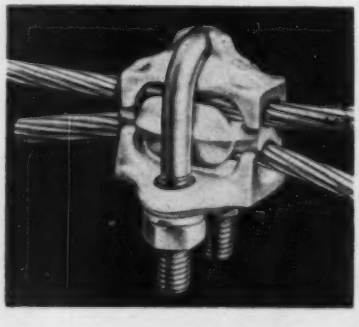
. . . that won't chip during assembly or when exposed to short-circuit surge shocks is now available. The molded fiber glass reinforced polyester insulator weighs less than 12 ounces and has high impact strength.



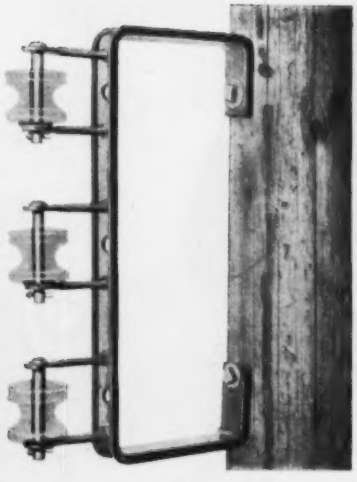
It is used in a variety of insulating spacing and bus support applications at voltages up to 5 kv. It can be exposed to temperatures as high as 150 C.
Glastic Corp, 4321 Glenridge Rd, Cleveland 21, Ohio

Dead-End Clip . . .

. . . for ACSR and aluminum is designed for secondary distribution dead-ending and tap applications where cost is a major consideration. The Clipit, type UW-R, is a high strength aluminum alloy connector.



Two sizes cover wire sizes from No. 6 through 2/0 aluminum or 1/0 ACSR. The connector has captured galvanized steel U-bolts that permit high tightening torque. It is coated with corrosion inhibiting compound.
Burndy Corp, Norwalk, Conn.



Secondary Rack . . .

. . . extended from the pole is available with either 8 or 12-in. wire spacing. It features one-piece construction and individual clevis pins that eliminate separate spool clevises, simplifying installation. The channel base imparts high strength for supporting large cantilever and deadend loads. The rack is hot-dipped galvanized for protection against corrosion.
Line Material Industries, McGraw-Edison Co, Milwaukee 1, Wisc.

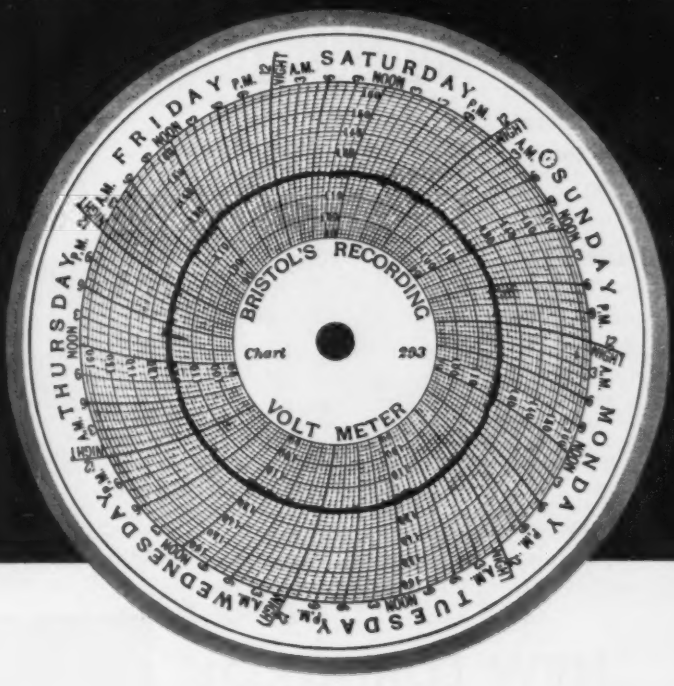
Silicone Rubber Tape . . .

. . . handles and feels like plastic tape. Called "Scotch" brand electrical tape No. X-1070, it is black, stretchable, conformable, and meets Class H requirements. It may be used in splicing silicone rubber-insulated cable, for insulating leads on large, dry-type transformers, and other applications where neither rubber nor plastic tape meets the requirements of temperature, corona or arc resistance. The pressure-sensitive tape has a dielectric strength of 700 v per mil, insulation resistance of 1,000,000 megohms, arc resistance of 135 sec, and elongation of 600%. Because of its inorganic construction, the tape can be used between temperature limits of −50 to +180 C. It is available in 18-yd lengths on a 1-in. core.
Minnesota Mining and Manufacturing Co, 900 Bush St, St. Paul 6, Minn.

(More New Equipment on page 92)

ALLIS-CHALMERS . . . 25 years of leadership in 5/8% regulators

2 Volts = $1920* per year



Here's how revenue loss is cut by holding a 2-Volt Band

MANY feeders are averaging high voltages during low load periods with low voltages during high load periods. The average may look good on paper. *But the result is a net loss of revenue!*

Regulating within a narrow 2-volt band width increases effective voltage, especially during the time of greatest load without changing the *average* voltage.

Each 1-volt increase in effective voltage increases revenue $960 on average feeder. Allis-Chalmers 5/8% step regulators hold a narrow band width of ±¾ volt.

For the complete story, call your nearby A-C office, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

*** Based on following factors:**

Peak demand — 2000 kw . . . Average demand — 800 kw . . . Annual load factor — 40% . . . Percent lighting and manually controlled heating — 30% . . . Value of kwhr — 3.4¢ . . . Power consumption varies as 1.6 power of applied voltage.

Originators of 5/8% Step Regulators

ALLIS-CHALMERS

A-5727

BIGGEST NEWS YET IN AUTOMATIC LIGHT CONTROL

NEW LUMATROL® MODEL T

Through the years, the unparalleled performance and reliability of Lumatrol Automatic Light Controls has been based on simplicity and quality of design, circuit and components.

Today, Lumatrol Model T is by far the simplest and most reliable of any on the market!

Zenith Sensing!
•
No orientation!
•
No effects from local lighting!
•
Tubeless, of course!

LUMATROL MODEL T IS THE ONLY TUBELESS CONTROL THAT ANSWERS "YES" TO ALL IMPORTANT REQUIREMENTS AND SPECIFICATIONS:

- 1800 Watts incandescent lamp load
- Adequate time delay for Mercury Vapor lighting
- Low Power consumption by day
- No power consumption at night
- 8½ ounces total weight
- Full protection against lightning and light transients
- Zenith light sensing
- No orientation
- Simple and rugged
- Case will not crack, craze or discolor in any climate
- Plug-in as proposed in EEI-NEMA specifications
- Two year guarantee against *all* manufacturing defects
- Fail safe

WRITE OR PHONE FOR COMPLETE INFORMATION & SPECIFICATIONS

MANUFACTURED UNDER PATENTS AND PATENTS PENDING BY
MICRO-BALANCING, INC., HERRICKS ROAD, GARDEN CITY PARK, L. I., N.Y. • PI 6-0851
IN CANADA: J. R. KEARNEY CORP. • BOX 270, GUELPH, ONTARIO

Telegraph Terminal . . .

. . . can transmit computer information or other telegraphic data at speeds up to 250 wpm. Standard frequencies offered include 18 narrow band 100 wpm channels in the 425 to 3315 cps frequency range. Additionally, a number of wide band 250 wpm channels are available above 1615 cps. The equipment is available packaged as a dual transmitter, dual receiver, or as a transceiver.
Radio Frequency Laboratories, Boonton, N. J.

Silicone Insulation . . .

. . . is available for a variety of power and control cables. These cables, known as "Simconex" cables, are suitable for temperatures up to 257 F. For special applications, they may be used up to 392 F. Simconex-insulated asbestos-braided power cables are available in sizes from No. 8 to 500 Mcm for 5-kv operation.
Simplex Wire and Cable Co, Cambridge, Mass.

More New Products

Aluminum Alloy—Alcan B51S—can be extruded easily for substation frameworks. It has good mechanical and welding properties.—Aluminium Limited, 630 5th Ave, New York 17, N. Y.

Stainless steel clad **copper wire** is used as a conductor for equipment operating under high temperature, corrosive, and oxidizing conditions. Known as "Oxalloy 28", it can be used for leads to heating elements in electrical resistance furnaces, appliances, and vacuum tubes.—Sylvania Electric Products, Inc, 1740 Broadway, New York 19, N. Y.

Winter liners for use under safety hats protect against sub-zero cold. Three different liners are available. They are completely free of metal and have non-conductive buttons to eliminate shock hazard. They are designed to afford protection in the sinus and back-of-the-neck areas.—Gentex Corp, Carbondale, Pa.

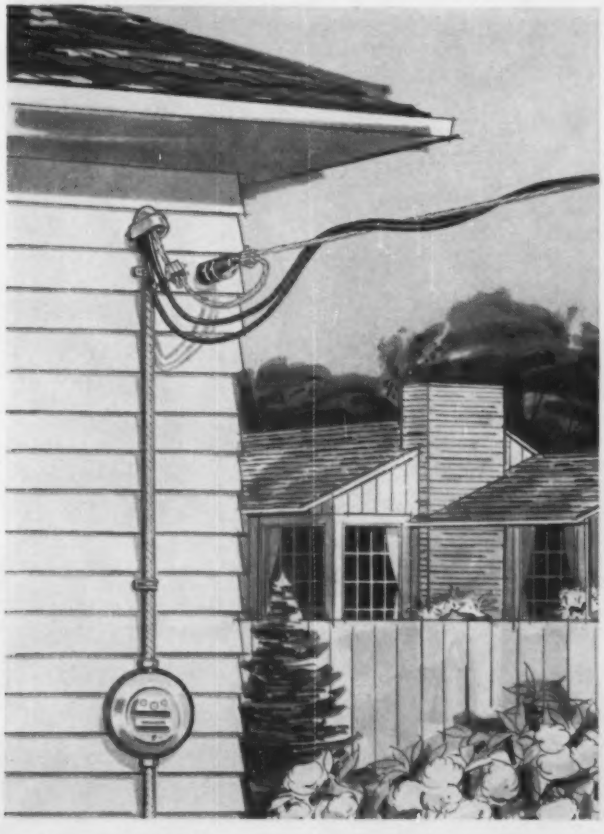
NOW! LOOK HOW MUCH YOU SAVE BY SWITCHING FROM COPPER TO ALUMINUM SE-U!

COST COMPARISON—ALUMINUM VS. COPPER

Service Entrance Cable
Concentric Uninsulated Full Neutral, Braid Jacketed
Underwriters' Type SE, Style U, 75° C. Operation

SERVICE		ALUMINUM		COPPER		SAVINGS WITH ALUMINUM	
Amperes	Feet	Conductor Size AWG	Cable Cost $	Conductor Size AWG	Cable Cost $	$	%
100	20	2	5.50	3	9.10	3.60	40
.....	40	2	11.00	3	18.20	7.20	40
.....	60	2	16.50	3	27.30	10.80	40
150	20	2/0	9.46	1/0	21.48	12.02	56
200	20	4/0	12.80	3/0	30.28	17.48	58

NOTE: Based on prices in effect as of September 15, 1958.



Check the table... at today's prices, braided aluminum SE-U saves you money over copper right down the line!

Note that the cost of #2 aluminum SE-U is *40% lower* than #3 copper SE-U. With the trend toward larger sizes, savings with aluminum become even greater—up to 58% for 200 ampere service! Neoprene jacketed aluminum cables offer similar savings.

FREE BROCHURE GIVES YOU THE FACTS

Our new, free brochure, *"KW Service Entrance Cable,"* points out the distinctive characteristics of both braided and neoprene jacketed aluminum cable, and fully explains why this cable offers definite advantages over copper.

It also describes and illustrates applications of SE-U Cable, as well as Single Conductor in Conduit, and contains a list of manufacturers of accessories for both applications.

Get your free copy of this informative 8-page brochure now. Mail the coupon!

KAISER ALUMINUM

IF IT CARRIES CURRENT, KW CARRIES IT!

Kaiser Aluminum & Chemical Corp.
Dept. 953
919 N. Michigan Ave., Chicago 11, Ill.

Please send your free brochure, *"KW Service Entrance Cable."*

Name_____

Address_____

City_____ State_____

EWo

Network Protectors Tested in ⅓ the Time

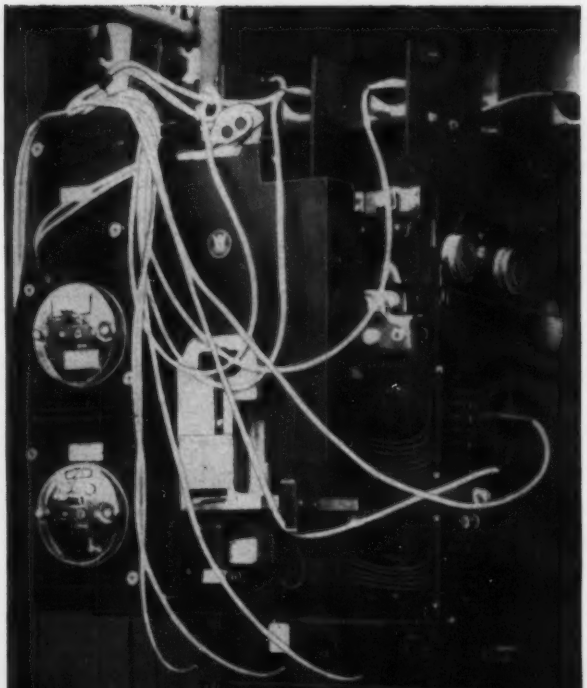
With New Westinghouse Universal Test Kit

Now . . . protector check out time can be reduced by 70 percent, compared to present testing techniques.

The Westinghouse test kit can be used with any network protector up to and including 480-volt, wye or delta styles for over-all operational tests, component checks, master phasing and insensitive relay calibration. Check these other money-saving features:

1. Three-phase field tests—relay calibration better than meter shop accuracy.
2. Protector left on normal system voltage—all components in circuit.
3. Also provides single component testing.
4. Test leads are cable bundled—multiple plug for quick hook-up.
5. Cable length permits remote testing of protector from outside the vault.
6. Extra-heavy-duty carrying case.

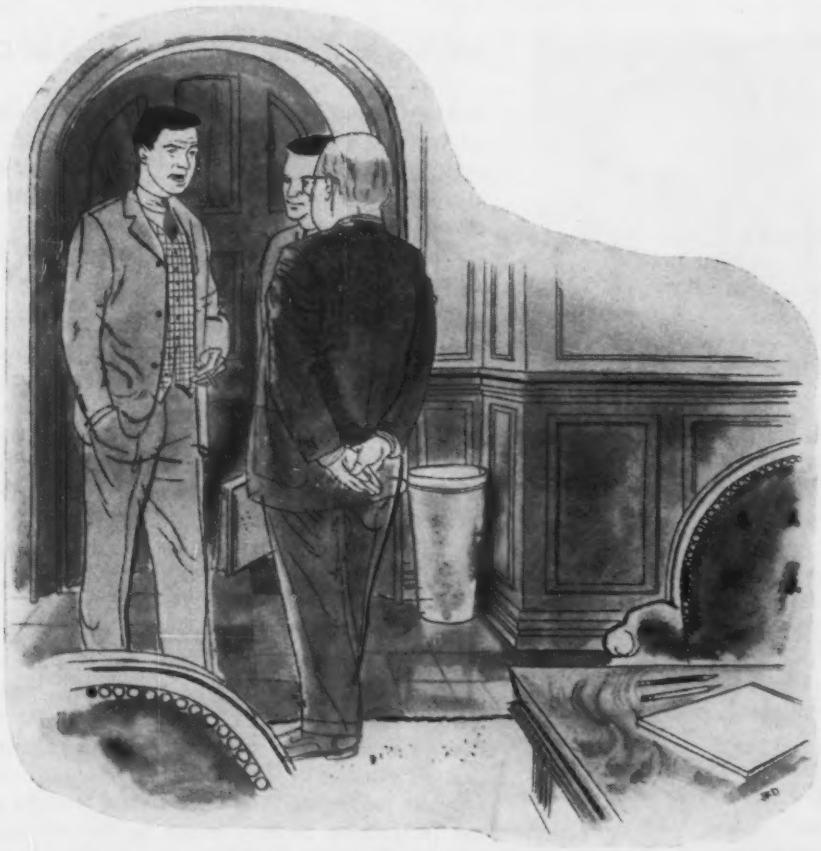
For more facts to cut your network maintenance costs, call your Westinghouse Sales Engineer. Or, write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pennsylvania. J-60963



YOU CAN BE SURE... IF IT'S

Westinghouse

Report on
Rates and Regulation



Normalization Attacked in California

The opening volley was fired recently in an investigation likely to have far-reaching effect on the entire utility industry. And one of the most explosive shells was a proposal by California Attorney General and gubernatorial candidate Edmund G. Brown that would force utilities to adopt liberalized depreciation whether they wanted to or not, and pass on all benefits to the rate payers.

Proceeding under its own motion, the California Public Utilities Commission had instituted a full-scale investigation into the rate-making aspects of the tax deferral arising from the use of Sections 167 and 168 of the Internal Revenue Code of 1954. Parties appearing before the commission presented four main contentions on treatment of liberalized depreciation for rate-making purposes:

- **That actual taxes should be used for rate making** whether or not a utility avails itself of the provisions of Sections 167 and 168.
- **That companies taking liberalized depreciation should use the "flow-through"** method, whereby only actual taxes are used as a deduction.
- **That taxes should be normalized,** since that not only implements the intent of Congress, but also benefits customers and stockholders.
- **That utilities should not avail themselves of liberalized depreciation at all,** because of the risks, uncertainties, and costs involved.

The case for liberalized depreciation as an aid to stockholders and rate-payers alike has been presented before, in Electrical World (February 10, 1958, p 97)

and elsewhere. This article considers only the proposals offered by the Attorney General's office—not only because of their intrinsic interest, but also because of their political implications in an election year.

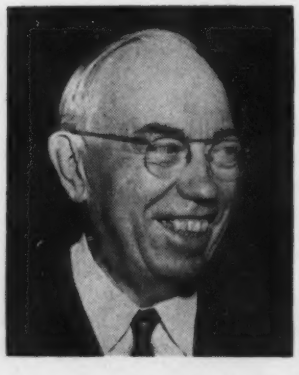
Petition of the Attorney General of California

Heaviest attack on the whole principle of normalization of tax-deferral for rate-making was the petition of Attorney General Brown himself. "It is the position of the Attorney General," the petition said, "that ratepayers should be charged in the form of rates only for such actual costs as a utility may incur, including only actual taxes and not 'phantom' taxes. It is contrary to correct and lawful rate-making principles and contrary to the public interest to impose upon the ratepayers an obligation for costs which do not in fact exist."

The petition went on to say that as consideration for the special privileges granted to California utilities, they be ". . . required to minimize costs of doing business consistent only with a fair rate of return to itself and efficient service to its customers. For that reason, the Attorney General petitions the commission to determine whether or not utility corporations of California subject to its jurisdiction have elected that type of depreciation under federal law which will result in the lower tax liability. The Attorney General asserts that it is the duty of this commission to compel such tax savings and that it is the duty of the utilities to elect such tax savings as may be available to them under pertinent provisions of the law."

In his reference to "phantom" taxes and non-existent costs, the Attorney General has apparently overlooked the fact that in many jurisdictions it is customary to impute a higher debt ratio than actually exists in order to come up with lower taxes in the cost of service. It is also customary to normalize storm-damage expense over several years, thus reducing the actual amount of storm damage as a cost of service in a test year for rate making. Finally, many states compute the depreciation reserve on a "reserve requirement" basis, rather than use the amount actually shown on the company's books. All these devices could be labeled "phantom" costs, and yet, because the customer gets reduced rates, they have had regulatory sanction for years.

Furthermore, there is some doubt that the California PUC could force utilities to take the purely permissive provisions of Sections 167 and 168 on a mandatory basis. In a recent rate case, the Superior Court of Pennsylvania turned down the City of Pittsburgh when it filed a similar petition which tried to make Manufacturers Light & Heat Co take accelerated depreciation instead of sticking to the straight-line method. The court sustained the Pennsylvania commission in its contention that there was no abuse of managerial discretion on the company's part, and that it was within its rights to use straight-line depreciation.



Petition for City of San Diego and Municipal Utilities Assn

Attorney General Brown's petition, however, was backed up by testimony from other sources. Witness Clarence A. Winder, consultant to the City of San Diego and to the California Municipal Utilities Association, made his position clear when he testified: ". . . the question presented is whether this commission should require a public utility to avail itself of the accelerated depreciation provisions, or in cases where a public utility does not avail itself of such tax-saving measures, whether it should fix rates upon the assumption that the public utility has done so."

After noting that normalization is predicated on the assumption that the provisions of Sections 167 and 168 will continue to exist indefinitely into the future,

the witness noted that ". . . it follows that such rate-making process must be based wholly upon speculation and conjecture. This reason alone is sufficient to rule out normalization from the rate-making process."

"There is no liability," Winder's testimony went on, "contingent or otherwise, for the payment of further federal income taxes because of the savings which are realized through the use of accelerated depreciation charges. Federal income taxes are payable on an annual basis, on net profits realized during the particular year and at a rate in existence during such year. Therefore, if a public utility does not employ one of the accelerated depreciation options available to it in order to reduce current federal income taxes, rate payers in the present will be prejudiced in the event that Congress should at some time in the future reduce the rate of corporate federal income taxes. Once lost, such tax savings can never be recovered." In conclusion, Winder urged the commission to look out for present rate payers by determining depreciation for rate-making ". . . by the use of accelerated depreciation without normalization of any kind."

". . . With respect to the future rate payer," Winder continued, "he must, in any case, pay rates which are determined by the then existing conditions, which would include the status of the federal income tax structure. Moreover, future rate payers will have received the advantages of newer and more efficient equipment which accelerated depreciation was designed to provide."

This testimony indicates that the witness prefers to benefit present rate payers, while letting those of the future shift for themselves. These future rate payers, he says, will presumably be benefited by the new equipment provided by the use of accelerated depreciation. However, the question may well be asked: How can this equipment be provided through liberalized depreciation when the tax savings realized thereby are immediately handed over to the rate payers?

Another feature of the testimony of this and other witnesses is the statement that federal income taxes are payable on an annual basis on profits realized during the year. Reiteration of this well-known fact smacks of a device to draw the attention of regulatory bodies away from the real issue, which is not a tax matter at all, but a problem involving all the aspects of rate making.

Testimony on Behalf of the Attorney General

The Attorney General also had as witness M. W. Van Scoyoc, formerly assistant chief of the Federal Power Commission's Bureau of Accounts, Finance and Rates. Van Scoyoc took the position that taxes are not deferred, but permanently reduced, and that utilities are in duty bound to take liberalized depreciation for rate making.

He admitted that on a single unit of property (assuming there is no change in the tax rate) the total taxes paid by the utility to the government will be the same at the end of the property's service life whether the straight-line method or a liberalized method is used for depreciation. He added, however, that while this was true for any single unit, it was not true when a succession of units was added year by year.

"As long as the utility continues to add property in excess of retirements," Van Scoyoc said, "the [tax] reserve will never decline. The utility will have continuous use of the ratepayer's money." He stressed the earnings which the tax deferral would bring to the utility, saying that ". . . under all 'normalization' proposals there is no restriction on the earnings arising out of the use of the money collected from the ratepayer." Actually, this statement is incorrect, since a substantial number of commissions have deducted the reserve or imputed zero return to it while permitting normalization. Also, a number of

companies (e.g. Commonwealth Edison Co in a recent rate proceeding) have themselves deducted the reserve from the rate base. After such an adjustment, a utility obviously cannot earn anything on the amount in the reserve.

But the inference is that not only does the ratepayer contribute through the cost of service the difference between taxes computed on the basis of straight-line depreciation and the lower taxes arising from accelerated depreciation, but in addition he is forced to pay rates on it.

This inference overlooks the fact that tax deferrals are not contributions by the ratepayer, but interest-free loans from the government. The FPC made this point clear in its ruling on the Panhandle Eastern Pipeline case. The inference also overlooks the fact that while the so-called loans may be interest-free, there is an element of risk attached to the moneys in the deferral, for which the utility's stockholders should be suitably compensated.

Van Scoyoc disposed of the question of Congressional intent with the statement: ". . . the so-called intent of Congress to liberalize the deductions for depreciation . . . is fully met when the utility computes and pays its income tax based on the use of one of the liberalized depreciation methods." To the question of whether or not the "no normalization" proposal would give preference to the customers of today over the customers of tomorrow, Van Scoyoc replied: "There can be no discrimination if the cost and revenues for the particular year of service are properly utilized in setting rates."

This last statement seems to hold the key to the whole controversy. The "future ratepayer" of today will some day be the "present ratepayer"—and the present voter. And, in some future year when the utilities finally do have to start paying back their deferred taxes to the federal government, it is unlikely that public officials will "discriminate" against those "present ratepayers," but will seek some other means of "properly utilizing" that year's cost and revenues to avoid raising electric rates.

As to whether or not a utility should take liberalized depreciation, the witness said: "If a utility refuses to secure such tax savings in filing its actual tax returns, I believe that this commission should set such utility's rates as if such utility had in fact taken advantage of such tax savings."

The California investigation is continuing, and there will be a great deal more testimony before the commission reaches a decision.

• • •

New rates went into effect Nov. 1 for Tampa Electric Co, under a $1.6-million increase in yearly gross revenue granted it in June by the Florida Railroad and Public Utilities Commission. Maximum rate of return under the new rate structure is 6.74%.

Tampa Electric had sought an increase of $3 million, and President William C. MacInnes says the company is still not happy with the allowed increase. He indicates Tampa will probably ask for a further hike in the near future.

Southern Wyoming Utility Co of Rock Springs has asked PSC permission to increase tariff rates to produce additional net revenue of $36,023.74 a year. Company said it was making less than 1% on plant investment under present rates. This return would be up to more than 4% under revised rates.

Ohio Public Utilities Commission has approved a plan by which Ohio Power Co can gain control of Seneca Light & Power Co. Ohio Power will issue 6,236 common shares worth $131,009 in exchange for Seneca's property.

A 15-kv 400-amp station-type disconnect at a distribution disconnect price

No Sticking!...No Burning! No Pitting!...No Welding Shut!

Silver-weld contacts, a unique new development, provide 20,000 ampere momentary rating for this distribution disconnect

How is it possible to get this performance?

The answer lies in the methods of applying silver to the contact surfaces.

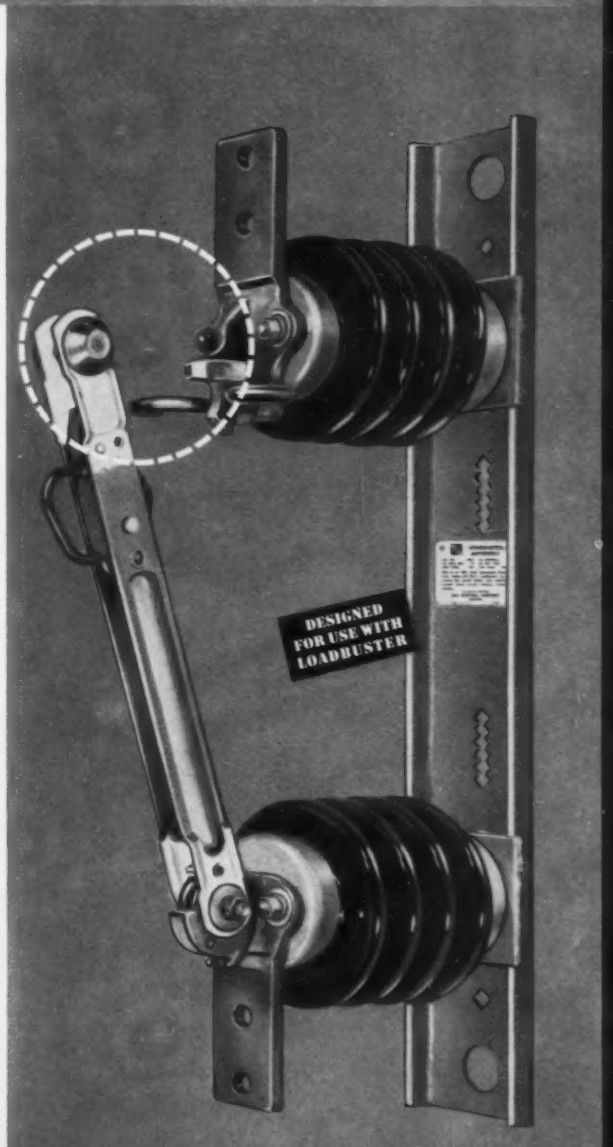
To apply silver to the contact castings, a new, patented process is used which includes special preparation of the contact surfaces, preheating them in a neutral atmosphere, fusing onto them molten particles of silver alloy, and then coining for hardness control, contour, and low porosity.

To apply silver to the blade, another method is used. The blade is silver-clad with extra-thick, high-density, low-porosity silver.

The result is a silver-to-silver contact which does not seize or gall and which makes possible the high current ratings.

But performance of a new disconnect is one matter, and performance after normal usage and exposure to atmospheric contamination is another. In practice, a distribution disconnect may be left in the open or in the closed positions for very long periods, with contacts exposed to corrosive atmospheres, typically without maintenance. Recognizing this fact, S&C has designed a disconnect that will carry its rated load, even after hanging open for long periods. On the other hand, this new S&C disconnect will open without difficulty, even after long exposure in the closed position.

And without extra cost, you get full load switching with LOADBUSTER® when you fit your distribution system with S&C LOADBUSTER Disconnects. Write today for Descriptive Bulletin 721, to S&C Electric Company, 4421 Ravenswood Avenue, Chicago 40, Illinois. In Canada: S&C Electric Canada, Ltd., 8 Vansco Road, Toronto 14, Ontario.



S&C LOADBUSTER® DISCONNECTS

Disconnects • Cutouts • LOADBUSTER® • Load Interrupters • Metalclad Switchgear • Fuse Links • Power Fuses

Specialists in High-Voltage Circuit Interruption Since 1910

The graceful lines of the Hubbard davit-type aluminum lighting standards add the charm of modern design to Philadelphia's historic streets. The city's ten-year plan to improve lighting is more than half completed.

HAPCO

Philadelphia's new davit-type lighting standards frame historic Independence Hall. Manufactured by Hubbard and Company's Aluminum Products Division, they are part of a ten-year street lighting improvement program which stresses beauty, permanence and economy.

This new lighting along Philadelphia's Walnut Street is providing ten times more illumination than the old system. "We believe the davit-type pole is the pole of the future, it's far ahead of any design we've seen anywhere" say Philadelphia's street lighting engineers.

Aluminum Standards Add Beauty and Permanence to Lighting in Historic Philadelphia...

A ten year plan that will step up illumination ten times, with less overall wattage, is now more than half completed in Philadelphia according to the city's street lighting engineers.

The plan introduces a new concept of beauty, permanence and economy in lighting standard design, and also *greatly reduces* lighting standard maintenance.

A large number of HAPCO davit-type lighting poles have already been installed, many of them along Walnut Street at historic Independence Hall and in the vicinity of the famous Connie Mack Stadium. This design resembles the familiar nautical davits used on board ships to suspend and lower small boats. The davit-type pole requires no brackets of the usual type and HAPCO design is doubly strong at the critical point of attachment because the extended portion fits over the upright part of the standard like a sleeve.

According to the engineers, the city had painted the street lighting standards every two or three years, running about $12.00 per pole. No funds have been allocated for the maintenance of the new aluminum poles—"simply because we don't expect them to require any maintenance."

In the complete line of HAPCO Standards and Brackets are designs for all types of modern, low-maintenance outdoor lighting installations. For more information write to Hubbard Aluminum Products Co.

HUBBARD ALUMINUM PRODUCTS COMPANY

Division of Hubbard and Company Pittsburgh 1, Pa.

Urge Utilities Study Flicker Limits (*Continued from page* 49)

manhole crew which formerly was able to excavate and adjust to grade 7 manholes per day can now adjust 18 manholes using extension rings. Faster installation reduces traffic congestion, and many jobs can be done during the normal work day which would otherwise require overtime rates.

Long range tree planting plans were discussed by representatives of several companies employing such a program. H. L. Williams, Cleveland Electric Illuminating Co, reported continuing success with CEI's comprehensive master street tree plan. G. R. Guthrie, Indianapolis Power & Light Co, noted marked improvement in maintenance costs, although the long-range program is still in the planning stage.

Pacific Gas & Electric Co has succeeded in obtaining the adoption of model tree ordinances in five counties and 68 communities in five years, C. E. Baugh reported. L. P. Works, Wisconsin Public Service, announced that cooperation of state agencies in support of the utilities' state-wide plan for Wisconsin has been good.

V. O. Bernthal, Commonwealth Edison Co, urged EEI sponsorship of a national program to aid utilities conducting tree campaigns, including data collection, brochure preparation, and publicity releases.

Careful attention to grounding practices and condition of street light fixtures was recommended by E. W. Glancy, American Telephone & Telegraph Co. He told the committee that these two factors had been most common in electric shock injuries to telephone company personnel.

Although established clearances between street light fixtures and telephone facilities are usually maintained, they are sometimes reduced for convenience, Glancy noted. Street lighting equipment is often poorly maintained and grounded, he added.

Vertical ground wires on joint use poles often present a hazard to telephone personnel. Grounded-Y systems are the most common offenders, Glancy said, because vertical ground wires are most common on this system. Most injuries have involved voltage present on ground wires which have not been connected to the system neutral.

Tests on fifteen-year-old poles originally treated with 5% pentachlorophenol have shown no signs of decay, according to H. A. Huber, Dow Chemical Co. Wisconsin Power & Light Co poles tested were purchased as 8 lb per cu ft retention of a 5% penta solution. Preservative content in the poles sampled was at a level which insures many more years of service life, he said. A total of 120 poles was tested.

ROMAN ARMOR'S BEST...
IT'S REALLY EASY TO INSTALL ROME'S INTERLOCKED ARMORED CABLE... EVEN BENDING PRESENTS NO PROBLEM
1
LOTS OF AIR AROUND THE ARMOR... HEAT IS'NT BOTTLED UP HERE LIKE IT IS INSIDE CONDUIT. THAT'S WHY THESE CABLES CARRY MORE CURRENT
3
ARMORED CABLE TAKES UP LESS ROOM THAN MULTIPLE CONDUIT RUNS... AND SEE HOW NEATLY T.J. COPE LADDERS ACCOMMODATE IT
4

Con Ed Displays Equipment at Meeting

A display of mechanized transmission and distribution equipment by Consolidated Edison Co was a highlight of the recent EEI Transmission and Distribution Committee meeting. An induction cable welder is shown.

Other featured mechanized aids included a cable hauling truck, horizontal earth boring machine, mobile field headquarters truck, and a manhole flushing and cleaning truck.

Wake Up, Utilities Told

(*Continued from page* 50)

Wisconsin P&L. In almost five years of operating experience there has been no emergency shut down on either of two units due to failure of any part of the boiler. Operating personnel quickly learned to handle the pressure-fired feature, he said. No precipitators were installed because 85% of the fly ash is removed as slag. Station power use is only 6½% of gross generation.

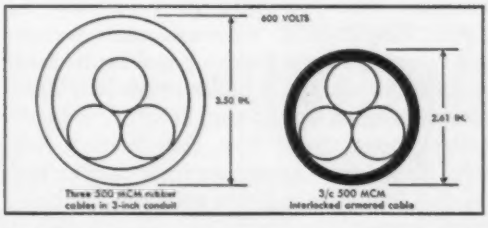
Savings of at least $1,200,000 per year have resulted from the Cleveland Electric Illuminating work simplification program, said A. A. Cox. The program, launched in 1951, is aimed at stimulating employees to come up with ideas for operational improvements. Proposal have exceeded 3,000 a year. In the past year, 2,900 proposals were accepted and put into effect.

Wisconsin has 26,150 electric barn cleaners, claimed W. G. Russell, Wisconsin P&L. These cleaners each use 250 kwhr per year.

For 600- to 15,000-volt service Rome's interlocked armored cable is available in three-conductor construction with Rozone A (butyl) insulation. It offers many more benefits than described here. For complete information, contact your nearest Rome Cable representative and ask for your free copy of Bulletin RCP-730. Or mail the coupon today.

ROME CABLE
CORPORATION

A matter of FACT



Reduced space requirements Less space is needed for Rome Cable's interlocked armored cable —almost one inch less width for each three-conductor 500 MCM interlocked cable than for cable-in-conduit type installations.

FREE BULLETIN describes all the benefits of Rome's Interlocked Armored Cable.

ROME CABLE CORPORATION
Department 730, Rome, New York

Please send me a copy of the new Rome Cable Bulletin RCP-730.

Name .....
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Company .....
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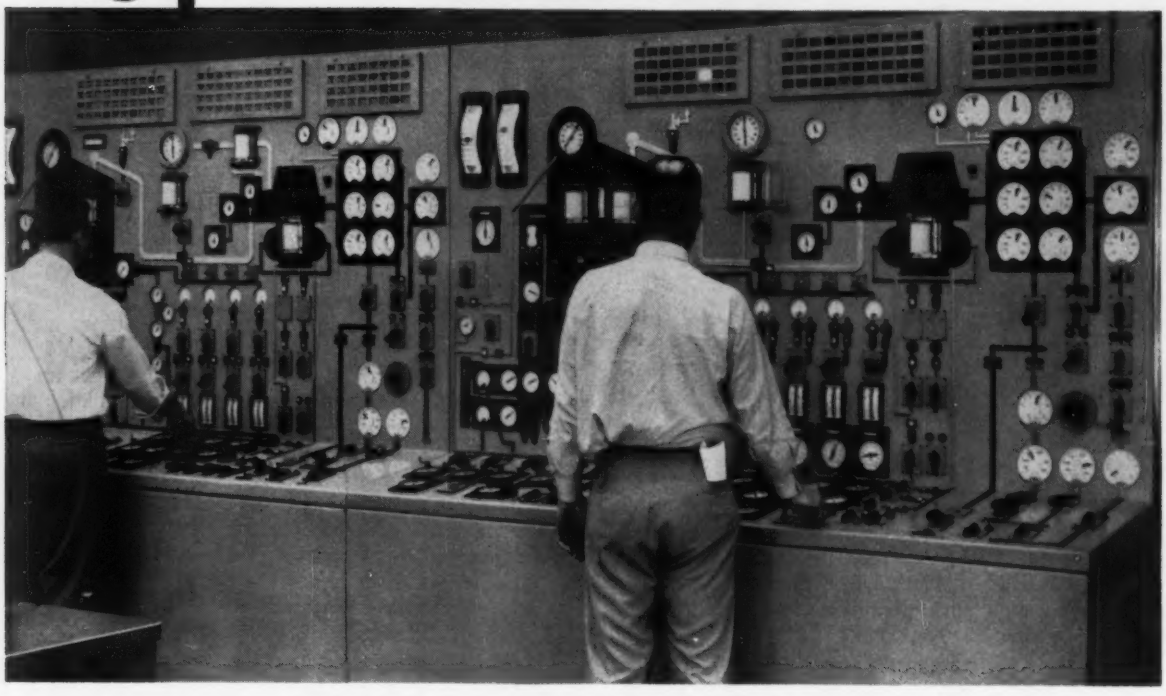
Type of business .....

How Copes-Vulcan control systems boost power plant efficiency



Copes-Vulcan puts combustion control at operator's finger tips

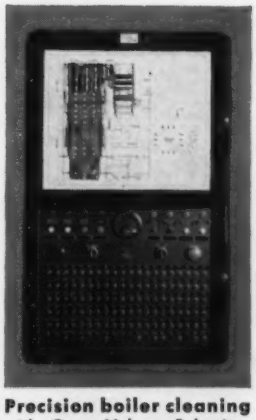
Equipped with easy-to-read recorders and control stations, this compact Copes-Vulcan panel centralizes operator control and simplifies boiler operation. This modern system features circuit simplicity with independent control loops on air flow, fuel loading and furnace draft. Drive units assure accurate positioning and fast response, and eliminate the need for interconnecting control loops.

A custom installation . . . a continuing service

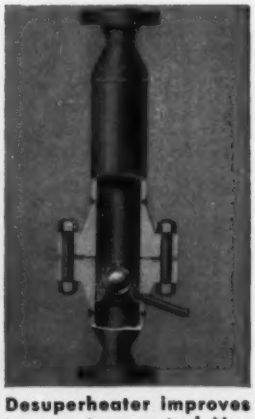
Copes-Vulcan Combustion Control is just part of an integrated boiler control system for regulating feed water, boiler steam temperature and boiler cleaning.

Whether furnished in individual units or integrated into a single system, each installation is tailored to meet specific requirements of generating capacity, load range and fuel. Copes-Vulcan supplies skilled service, when needed, for the life of the installation.

Write for Bulletin 1032 showing a Copes-Vulcan control system working at a showcase generating plant.



Precision boiler cleaning with Copes-Vulcan Selective-Sequence or Automatic-Sequential soot blowing systems. Space-saving panel permits easy monitoring, flexible programing . . . assures thorough cleaning with less steam and/or air. Write for Bulletin 1029.



Desuperheater improves temperature control. New Variable-Orifice Desuperheater* holds reduced steam temperature constant only 20' downstream from desuperheater outlet, even over a 50-to-1 load range. Write for Bulletin 1037. *Patent applied for

Copes-Vulcan Division
BLAW-KNOX COMPANY
Erie 4, Pennsylvania

Click! Con Ed Records Dream Kitchens

Women calling at the new Con Edison kitchen planning center in New York City can come away not only with plans for a remodeled kitchen but also a photograph of a scale model of what the new kitchen will look like. It's all done with scale models of appliances and cabinets and a Polaroid Land Camera.

The center was set up last year as the result of a survey which showed what New York's apartment dwellers wanted in their kitchens, (EW, Feb. 4, 1957, p 76; Aug. 25, 1958, p 90). Now a planning service section has been added. A special "planning table" was built adjacent to a modern all-electric kitchen. On her first call the customer is given a worksheet with a series of small squares on which she can take home and draw the dimensions of her own kitchen.

Returning with this plan, the prospect and a hostess sit down at the planning table (see photo) which has larger squares corresponding to the smaller squares on the worksheet. A sliding board has been built into the front of the table. A specially designed box, on top of which the camera is anchored, contains two flood lamps—thus eliminating the cost of flash bulbs—and fits over the end of the board. The board is graduated with painted lines, each with two numbers corresponding to the proper close-up lens and distance setting that should be used. To make sure the prints are filled with every detail of the miniature kitchen a set of close-up lenses has been attached to the camera.

The lined area in the table's center where the models are placed, can be revolved so pictures can be taken from different angles if desired. A timer, attached to the table leg, times the one minute development of the pictures.

Large wooden racks line three sides of the table and contain the model appliances and cabinets and manufacturer promotional literature.

The hostess lays out a modern kitchen using the scale models, according to the housewife's desires.

(*Continued on page* 109)

FORM 406
FLUORESCENT LUMINAIRE

INTERNAL FAN COOLING

- Air-circulation system—a G-E exclusive—boosts light output of luminaire up to 25%.
- Four Power Groove lamps generate 37,200 lumens.
- No increase in unit cost.
- Completely factory-assembled and tested; shipped in *single* carton.
- Ideal for business streets, traffic arteries, expressways, interchanges, parking lots, shopping centers. 450-3.1

Progress Is Our Most Important Product

GENERAL ELECTRIC

HOW YOUR PLANT CAN PROFIT FROM THIS MAN'S SKILL. Dowell engineers are experts in the use of chemical solvents to remove scale and sludge—those profit-robbing deposits that cut the capacity of your process systems, tanks, piping. Using the Dowell method of chemical cleaning you get more throughput, less down time—to make possible greater overall plant efficiency.

Here's how one corporation employed the skill of the Dowell engineer and his group: Following construction and before the plant was put on stream, the company called in Dowell to remove mill scale.

Total cost of this mill scaling service was $5000. Once in production the plant did not have a single major shutdown for maintenance due to mill scale. Management of the plant credits Dowell service with helping them net an operating profit of somewhere between 10 and 20 times the cost of the chemical cleaning. That amounted to between $50,000 and $100,000 the first year.

With Dowell service you get 15 years experience in chemical cleaning, full lines of equipment and chemicals—plus an engineered job—performed by trained crews.

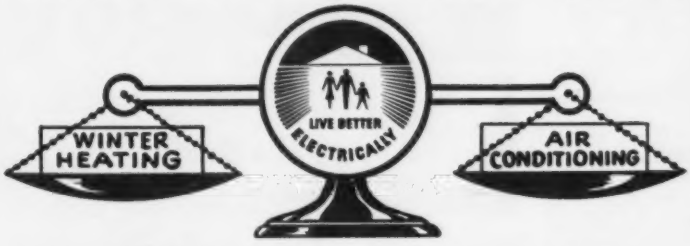
Every type of industry can profit from Dowell methods of chemical cleaning. Ask your maintenance and operating engineers if they have all the facts—the profit possibilities—on Dowell service. DOWELL—A SERVICE DIVISION OF THE DOW CHEMICAL COMPANY. Headquarters and research center, Tulsa, Oklahoma; 165 offices and stations to serve you.

Chemical cleaning services for industry DOWELL

BUILD YOUR WINTER LOAD with ELECTROMODE

ELECTROMODE All-Electric HEATERS

The perfect BALANCE for your Summer Air Conditioning Demands



EVERYWHERE, *more and more people are* LIVING BETTER ELECTRICALLY

and Electromode is ready with the World's *Safest* and most complete line of All-Electric Heaters, to help utilities stabilize their loads on a year 'round basis.

More than 100 Models, specifically designed for the needs of

HOME • FARM • INDUSTRY

ELECTROMODE BASEBOARD ELECTRIC HEATERS

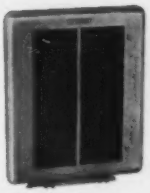
WALL-TYPE FAN-CIRCULATING HEATERS

For All Size Rooms

Bathroom Heaters

Also made in Portable models, modern designs, and capacities for large and small rooms.

Other Electromode HOME Heaters: Radiant Cable Heat and Radiant Convection Panel Heaters



Down-Flo Heater for Big Rooms

Suspension-Type Heater

FOR INDUSTRY

Electromode Heaters are made in Suspension-Type, and Combination Portable and Suspension Heaters, as well as Explosion-Proof Heaters, specifically designed and approved for use in hazardous areas.

ALL AROUND THE FARM

Milk House Heater

Pump House Heater

Why Electromode is SAFEST!

because only Electromode has the Safety Grid, a completely sealed-in cast-aluminum heating element. No exposed hot wires or glowing coils. No danger of fire, shock or burn. Automatic safety switch prevents overheating.

ELECTROMODE

Division Of

COMMERCIAL CONTROLS CORPORATION

Get Complete Information From
Dept. EW-118 570 Culver Road
Rochester 3, New York

"TEE-LIGHTING" FLUORESCENT SYSTEM

NEW STREET-LIGHTING CONCEPT

- Ideal for "prestige" lighting of business whiteways.
- Highest utilization efficiency of any fluorescent system.
- Greater driver comfort.
- Uni-directional reflectors in parallel units aim light across street.
- Parallel fluorescent units, 18,600 lumens each; transverse unit, 18,600 to 55,800 lumens. 450-3.2

Progress Is Our Most Important Product

GENERAL ELECTRIC

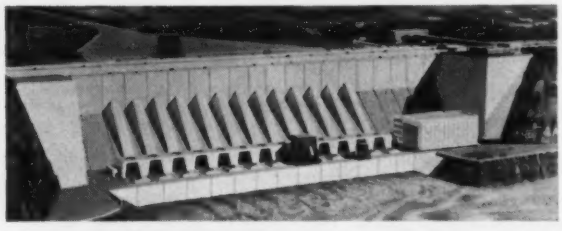
For Niagara Power, B-L-H builds America's mightiest turbines—200,000 hp Francis type

Work is now well underway at Baldwin-Lima-Hamilton's Eddystone Division on an order for seven Francis-type turbines—the most powerful hydraulic turbines ever made in the United States—for the main generating plant of the Niagara Power Project. Each is rated at 200,000 hp when operated for best efficiency at 120 rpm under 300-ft. head.

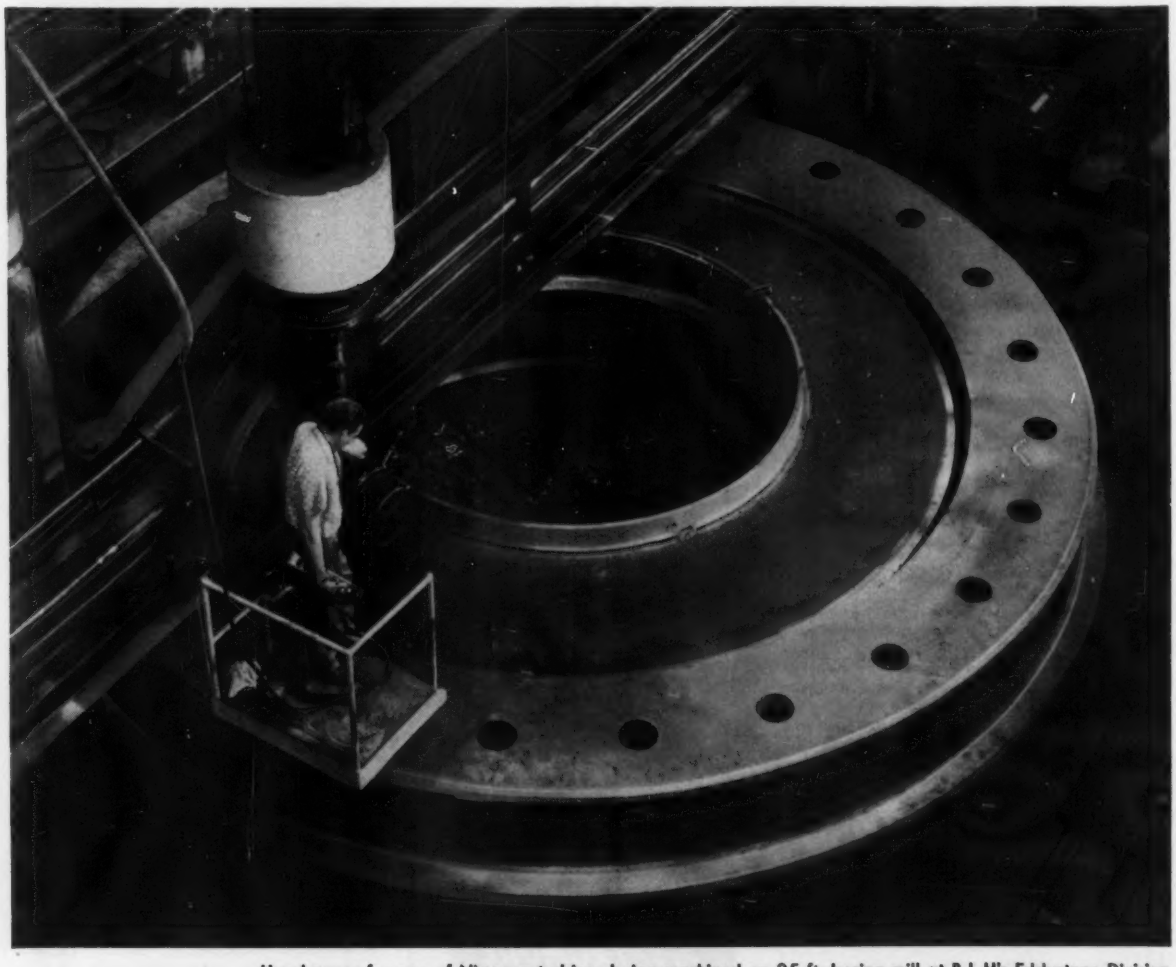
The first turbine is to be delivered by June 1, 1959. First power from the huge plant, a 2,000,000 kilowatt installation, is scheduled for 1961.

The Niagara Power Project is only one of many hydroelectric operations throughout the world—The Dalles Dam, Garrison Dam, St. Lawrence Power Project, to mention a few others—that have called upon B-L-H's 130 years' experience in designing and building hydraulic turbine equipment.

For specific information about our products and services, write to Eddystone Division (B-L-H), Philadelphia 42, Pa., or Pelton Division (B-L-H), 2929 Nineteenth St., San Francisco 10, Calif.



Artist's conception of Niagara Power Project's main generating plant. Courtesy Power Authority of the State of New York.



Head cover for one of Niagara turbines being machined on 25-ft. boring mill at B-L-H's Eddystone Division

BALDWIN · LIMA · HAMILTON

Eddystone Division

Philadelphia 42, Pa.

Hydraulic turbines • Weldments • Dump cars • Nonferrous castings • Special machinery • Bending rolls • Machine tools

Over 20 Years of Experience & Know-how in Street Lighting Controls!

WRITE TODAY FOR COMPLETE DATA

SunSwitch
DIVISION
RIPLEY COMPANY, INC., MIDDLETOWN, CONN.

SPECIFY THIEL HEAVY STEEL TRANSFORMER HANGERS

MODEL	C-1	C-3
TRANSFORMER	75-100 KVA SINGLE PHASE	75-112½ KVA THREE PHASE
WEIGHT	46 LBS.	100 LBS.

THIEL NEMA Specification Conventional Type TRANSFORMER HANGERS

THIEL HANGERS ARE MADE ACCORDING TO NEMA SPECIFICATIONS. HEAVY STEEL CONSTRUCTION. HOT - DIP GALVANIZED FOR DEPENDABLE SERVICE AND LONG LIFE. FOUR STYLES COMPLETE WITH GALVANIZED BOLTS AND NUTS.

HANGER KICKERS IN TWO SIZES FOR "T"-TYPE HANGERS

T-TYPE HANGERS In Two Sizes for 3.50 KVA 1-Phase and 9-45 KVA 3-Phase Transformers.

IN STOCK FOR IMMEDIATE DELIVERY

THIEL TOOL & ENGINEERING CO., INC.
417 N. MARKET ST. LOUIS 6, MO.

Dream Kitchens

(*Continued from page* 105)

The hostess then photographs this plan, waits 60 seconds for the picture to develop, and presents her with the picture and literature in a kitchen information folder.

With this the customer can go to a kitchen modernization dealer and show him exactly what she has in mind.

Why the use of the Polaroid camera? According to John C. Murtha, sales promotion general manager, it has three advantages: It overcomes the normal 2-3 day delay in having pictures developed; extensive bookkeeping in numbering, filing and mailing each picture to the customer is eliminated; and ease of operation.

Murtha estimates the cost of each print at about 23 cents, a saving of more than $1,800 a year over the cost of a commercial photographer.

He points out that the service is not a substitute for kitchen modernization services, but simply a means of providing the impetus to get the housewife to the kitchen dealer.

But he's pleased with it. This new service is building load. "In replanning her kitchen, the woman is bound to include some heavy-duty equipment, such as a washer-dryer, dishwasher, freezer, etc., and these have a marked effect on the amount of electricity she uses," he said.

What Do Women Want? Housing Confabs Find Out

If you want an opinion on a certain subject ask a woman. If you want lots of opinions ask lots of women. Two organizations decided this was the way to get answers to some questions they had so they held conferences recently open strictly to the female sex. One was the Third Annual Women's Conference on Housing, sponsored by the National Association of Home Builders and ten industry co-sponsors; the other was McCall Magazine's Second Annual Congress on Better Living. Both were held in Washington.

Some of the women had lots to say about what they want in the way of electrical living. Eighty housewives at the housing confab ventured these opinions:

(*Continued on page* 111)

OPERATION upturn
Buy now for extra values
GENERAL ELECTRIC

Get EXTRA VALUES from G.E.'s Outdoor Lighting products

"POWER PACK" MERCURY LUMINAIRE

NEW BUILT-IN BALLAST

- Only two terminal connections—saves up to 30 minutes per unit installation.
- Eliminates need for ballast-adapters or transformer-base poles—saves $30 to $65 per pole.
- Same outstanding lighting efficiency you have experienced with the General Electric Form 400—best in the industry.
- Low ballast losses. 450-3.3

Progress Is Our Most Important Product

GENERAL ELECTRIC

NO AGE-HARDENING PROBLEMS!

ROEBLING TELLURIUM LEAD ALLOY SHEATH...

There's nothing worse to an electrical utilities system than hardening of the arteries. That's a problem eliminated by Roebling Tellurium Lead Alloy Sheath! Even after 6½ years' life (in the lab and on the job), age-hardening is negligible in this remarkable sheath. Moreover, heat stability is outstanding . . . bending life is 4½ times greater than that of ordinary sheath . . . there's almost no "creep" at all!

The Roebling Paper Power Cable inside is built for dependability and long life, too. In fact, there's no better buy than Roebling Paper Power Cable with Tellurium Lead Alloy Sheath! An interesting technical booklet, now available, tells you exactly *why* it's such a good investment. Write for your free copy to: Electrical Wire Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation

Roebling electrical wires and cables are available with either copper or aluminum conductors.

Housing Confabs (*Continued from page* 109)

• They want their home wired for greater use of electric power and they want zoned heating.

• They demand outside electric outlets. The great majority object so much to pole lines for service wires that they are willing to pay—up to $150—for buying these facilities.

• Air conditioning is regarded a high-cost luxury, except in the South and Southwest. All of the delegates, however, want to be informed on air-conditioning systems and costs.

• Few of the women know anything about heating a house with electricity. They liked the cleanliness of electric heat, but feared high operating costs.

• The delegates want to do their own buying of major appliances that are often installed by the builder. They particularly oppose financing appliances in the house mortgage.

• But they want the wiring of their new house to provide for all these appliances, and they ask for a wiring diagram of the house, to be transferred with the deed from owner to owner.

One hundred homemakers attended the McCall's congress.

• They prefer buying a larger house that is not equipped with built-in appliances.

• They feel washers and dryers are no longer a luxury but a necessity.

• Price is not a prime factor in purchasing any appliance. Features to speed up their work are.

• Seventy-two percent of the women are now in a buying mood.

• Another complaint was that built-in ovens have no adjacent work counter and do not provide space for a rotisserie, meat thermometer, etc.

• Ease of cleaning is an important factor in selecting an oven.

• What built-in kitchen equipment do they plan to acquire? A dishwasher first, then an oven, counter top cooking surfaces, and a refrigerator.

NEW FORM 400C
MERCURY LUMINAIRE

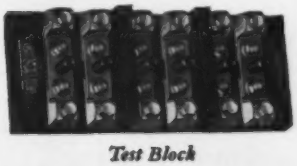
ONE-PIECE REFLECTOR HOUSING

- New General Electric one-piece, anodized-aluminum reflector-housing.
- Lighter weight for easy installation and maintenance; larger volume for effective heat dissipation.
- Outstanding versatility; operates five lamps, provides four IES distribution types.
- With precision-molded glass refractor, provides unequalled photometric performance. 450-3.4

Progress Is Our Most Important Product

GENERAL ELECTRIC

Look to Superior for
TEST SWITCHES AND BLOCKS



Test Block

Test Switch

Superior also offers a complete line of
Enclosures
Socket Equipment
Test Tables

SUPERIOR
SWITCHBOARD & DEVICES CO.
CANTON, OHIO
A subsidiary of
The Union Metal Manufacturing Company

Catalog 55 offers complete information on features, services, type and sizes. Write to:

HOW TO LIGHT A BRIDGE AT LOW COST!

Five miles of lighting with aluminum standards brightens new bridge... lightens maintenance budget

By specifying lighting standards of corrosion-resistant aluminum, the Mississippi River Bridge Authority eliminated spiraling costs of painting and repainting once and for all. Although these aluminum lighting standards are exposed to the ravaging action of an industrial and seacoast environment, they'll stand up virtually unaffected for decades to come—attractive, durable, maintenance-free.

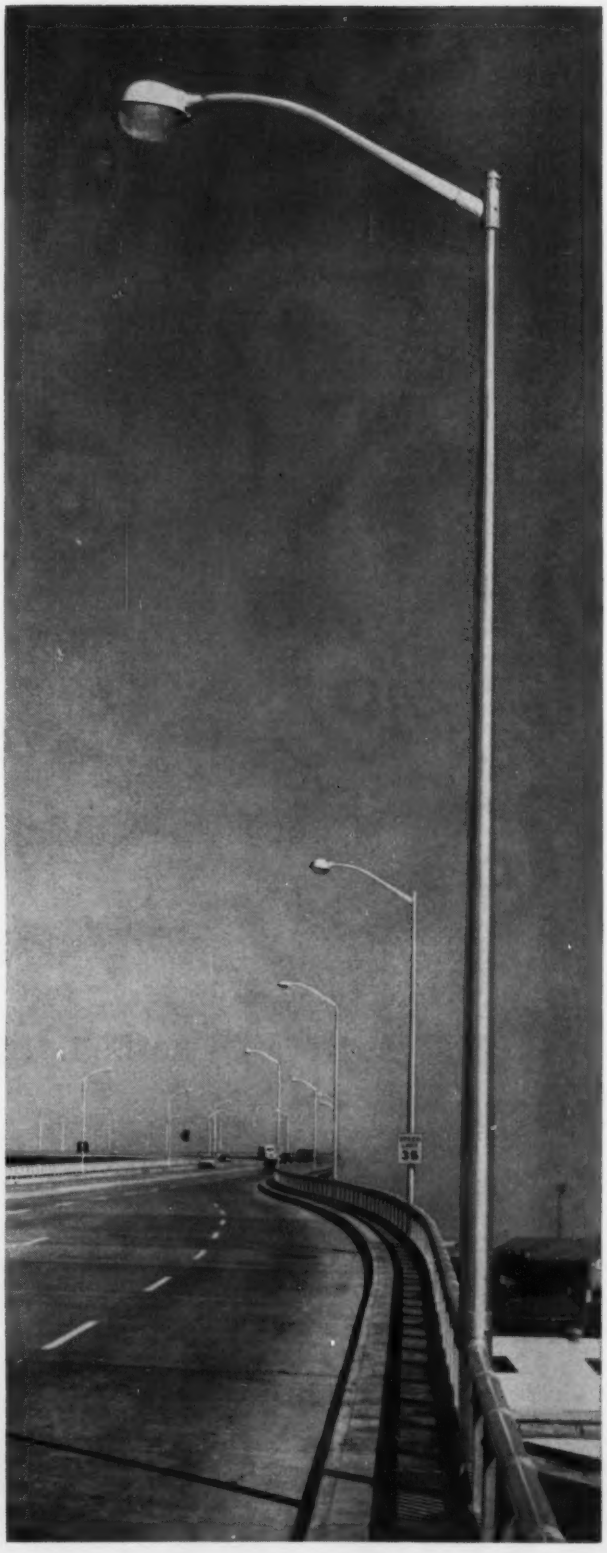
Comparable in cost to other types, lightweight lighting standards of Alcoa® Aluminum offer economies from the outset. They cost less to ship and handle; contractors erect them faster with less man power. Six different types of lighting standards installed at various locations on the bridge and its approaches indicate aluminum's wide range of design flexibility for standards, brackets and luminaries.

Alcoa does not make lighting standards, but we can supply you with the names of manufacturers who do. For these names and any additional information about lighting standards of Alcoa Aluminum, write to Aluminum Company of America, 1977-L Alcoa Building, Pittsburgh 19, Pennsylvania.

Your Guide to the Best in Aluminum Value

ALCOA THEATRE
Fine Entertainment, Alternate Monday Evenings

WE CHOSE ALCOA ALUMINUM MILL PRODUCTS



High above Old Man River is the world's longest cantilever highway span, the Greater New Orleans Bridge, an important link in Louisiana's expressway development plan. Consulting engineers: Modjeski and Masters, Harrisburg, Pa. Lighting standards: Pfaff and Kendall, Newark, N. J.

News About People

BC Electric Appoints New VP's

STEEDE

British Columbia Electric Co has appointed two new vice presidents and announces the retirement of a third.

The two new vice presidents are Jack H. Steede, chief engineer, electrical division who will be in charge of all electrical operations on the mainland, and John J. Carson, director of industrial relations, who will handle employee relations. W. C. "Bill" Mainwaring, assistant to the president, is retiring.

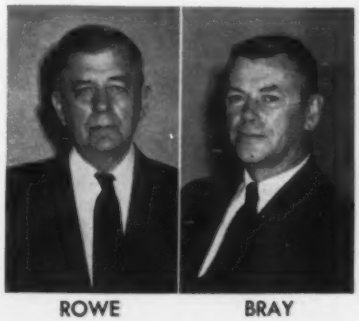
A. E. Grauer, president of B. C. Electric Co takes over as president of Western Development and Power, a position formerly held by Mainwaring.

Bray Named President of Boston Firm

Hartley Rowe has been named chairman of the board and Oscar S. Bray president of the newly formed Jackson & Moreland International Inc, a wholly owned subsidiary of Jackson & Moreland, Inc, Boston engineering firm.

Rowe, until recently vice president and chief engineer of United Fruit Co, has devoted a large part of his career to Latin American problems. He also served as director of research, communications and purchases for United Fruit.

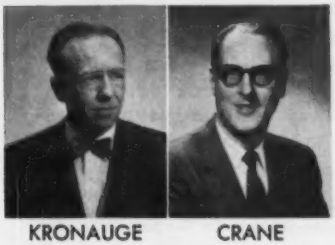
Bray has been associated with Jackson & Moreland since 1941 in engineering and administrative capacities. Previous to that he had nine years of experience with the United States Dept. of Interior.



ROWE BRAY

Kronauge, Crane Get New Posts

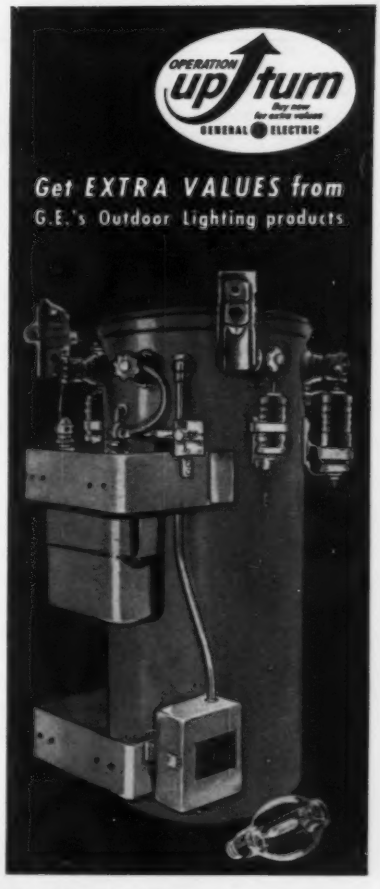
William G. Kronauge has been named vice president in charge of sales for the Coolerator Division of McGraw-Edison Co. Penn-Union Electric Corp has appointed Lester R. Crane sales manager.



KRONAUGE CRANE

Kronauge will be responsible for his company's sales development program and act as advisor to the president. He was previously with Frigidaire and Kelvinator.

Previous positions for Crane include headquarters distribution sales manager and distribution products manager for Anderson Electric Corp, sales manager of switchgear and connectors at A. B. Chance Co, and seven years with Westinghouse Electric Corp.



FOR 400-WATT SERIES APPLICATIONS

BALLASTLESS MERCURY SYSTEM

- New 400-watt mercury lamp with built-in cutout—*exclusive* G-E development gives reliable operation.
- *Packaged* substation-type regulator—another G-E *exclusive*, combines *all* control equipment in self-contained, pre-assembled package.
- Eliminates need for separate ballasts for series circuits.
- Reduces costs of installation, operation, and maintenance. 450-3.5

Progress Is Our Most Important Product

GENERAL ELECTRIC

John T. Cunningham has joined Commonwealth Service Inc as consultant in the fields of public and stockholder relations.

Canadian Utilities, Limited, appoints **J. N. Ford** general manager.

Anthony J. Pansini has been assigned to direct the study of the possible use of electronic computing equipment at various Long Island Lighting Co locations. He will manage the new systems and procedures department of Lilco.

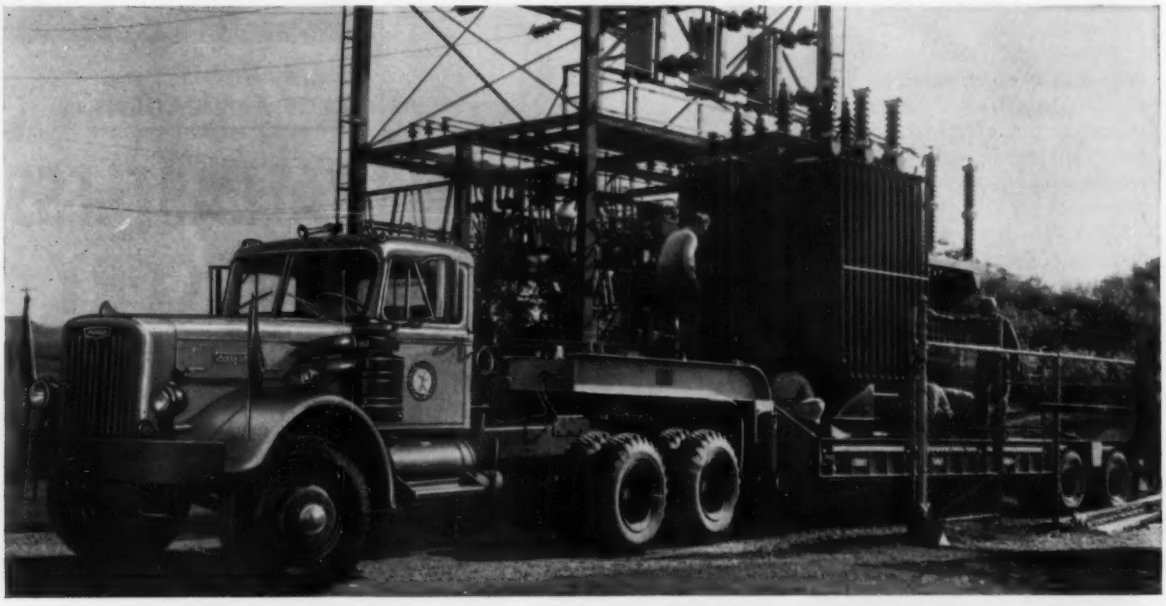
These two men retired recently: **William H. Woods, Jr,** supervisor in distribution engineering of the Virginia Electric & Power Co and **Isaac F. Deibert** of the Potomac Edison Co.

These retirements have been recently announced: **James Michael Everitt,** service department, Potomac Edison Co; . . . **Alexander A. Collie,** plant superintendent at the A. L. Cole generating station of the Saskatchewan Power Corporation.

Grant County Public Utility District of Ephrata, Wash., has appointed **C. R. Simmons** plant superintendent and **Jess Barksdale** assistant plant superintendent of the Priest Rapids Dam.

Chairman John A. McCone of the Atomic Energy Commission has appointed an Ad Hoc Advisory Committee on Reactor Policies and Programs as follows: **James Black,** chairman of the board, Pacific Gas & Electric Co; **Marion W. Boyer,** Standard Oil Co of New Jersey and formerly general manager of the AEC; **Dr Harvey Brooks,** dean of engineering and applied physics, Harvard University, and presently a member of the AEC's statutory advisory committee on reactor safeguards; **Eger V. Murphree,** president, Esso Research and Engineering Co, and presently a member of the commission's statutory general advisory committee; **Dr. Henry D. Smyth,** chairman, board of scientific and engineering research, Princeton University, and formerly a commissioner of the AEC; **Eugene Starr,** Bonneville Power Administration; **Dr Robert E. Wilson,** formerly chairman of the board of Standard Oil Co of Indiana, presently a member of the commission's statutory general advisory committee. The chairman of the committee, under the Code of Federal Regulations stipulating how boards and committees advisory to the commission shall operate, is **A. Tammaro,** assistant general manager for research and industrial development. The committee elected **Dr Henry D. Smyth** as its vice chairman.

(*More News About People on p* 117)



AUTOCAR FOR BIG MOVING JOBS

Ohio Edison Company, Akron, Ohio, is one of many companies that use Autocar in their business—for example, powerful Autocar tandem trucks like this one to handle its big moving jobs on and off highway. Autocar has the power regardless of terrain—and is custom engineered to give rugged service year after year.

It's AUTOCAR—*for extra earning power*

Autocar Division, The White Motor Company, Exton, Pa.

ADVERTISEMENT

How PAGE Stainless Steel Strand can cut your strand costs 12% to 50%!

• The table of costs shown below illustrates how PAGE Stainless Steel Strand not only can save you substantial sums each year, but can eliminate the troubles of frequent replacements.

From these figures—based upon a 30-year service life expectancy of poles and towers—it is readily apparent that, from the standpoint of long-range economy, PAGE Stainless Steel Strand is far superior to galvanized. One fact stands out: replacement of strand so long as poles and towers remain serviceable is uneconomical. PAGE Stainless Steel Strand makes this cost unnecessary.

Since 1946—no replacement caused by strand failure

PAGE introduced Stainless Steel Strand in 1946. Since that time, *no* PAGE *installation has required replacement*, despite steady increase in the use of our Stainless Steel Strand in static, messenger and guy wire applications.

One installation, where galvanized strand had failed within seven years, was replaced in 1946 by PAGE Stainless Steel Strand; today, after yearly inspection, it shows no sign of corrosion or deterioration.

CHART OF COMPARATIVE STRAND COSTS...30-YEAR PERIOD

	3/8" Class A Galvanized High Strength Strand	3/8" Class C Galvanized High Strength Strand	9/32" PAGE STAINLESS STEEL STRAND T-302
Breaking strength (lbs.)	10,800	10,800	10,700
Cost of strand (per 1000 ft.)	$ 58.79	$ 74.11	$160.00
Installation costs	$200.00	$200.00	$200.00
Total	$258.79	$274.11	$360.00
Life expectancy	10 years	20 years	30 years
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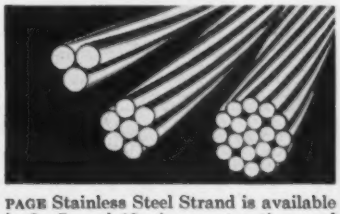

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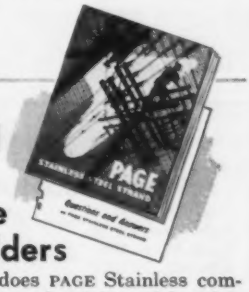

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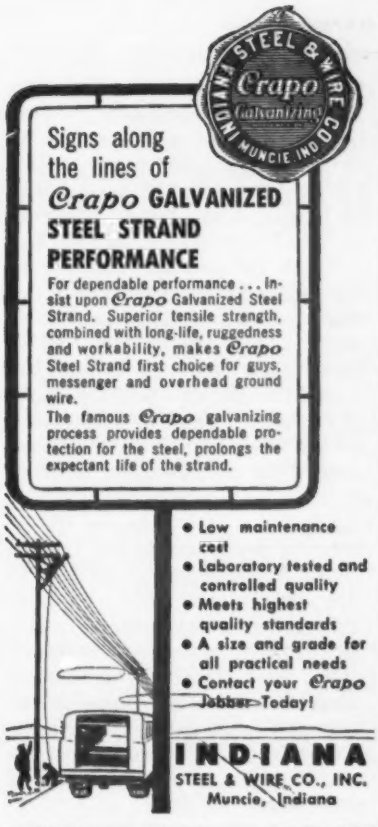
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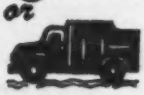

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New appointees to Allis-Chalmers Manufacturing Co's Power Equipment Division are **Mario A. Marcanio,** assigned to the steam turbine department's mechanical design section, and **Richard J. Wondra,** named to the switchgear department. **John M. Michels** has been assigned as a physicist to Allis-Chalmers Nuclear Power Division.

J. B. Ogden, vice president—sales, Airtemp Division, Chrysler Corp, has been reelected chairman of the room air conditioner section, National Electrical Manufacturers Association. **L. M. Larkin,** general manager, Air Conditioning Division, Whirlpool Corp, was named vice chairman, succeeding **Paul Augenstein,** president of Chrysler Airtemp.

Whirlpool Corp has promoted **Lincoln M. Larkin** to the position of general manager of the air conditioning division.

Westinghouse Electric Corp has added **Charles M. Garvey** and **Fred S. Muerer** to the New York public relations staff.

Youngstown Sheet & Tube Co has announced the retirement of **William E. Fowler,** vice president, traffic and purchasing.

OBITUARY

James C. Blakey, 54, attorney for the Alabama Power Co, died in Birmingham, Ala., of a heart attack.

John Lamb, 55 secretary of the Illinois Commerce Commission, died recently of an apparent heart attack suffered while on a train bound from Chicago to Springfield, Ill.

John S. Dickson, retired manager of the Wahkiakum County PUD, died on Oct. 13.

Alfred S. Walker, 65, retired vice-president of the New England Power Co, died suddenly at Weston, Mass., on Oct. 18.

Samuel D. Montgomery, 48, assistant treasurer of the American & Foreign Power Co, Inc, died recently in East Orange, N. J.

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Readers Forum

Wrong Utility

To the Editor:

We read with a great deal of interest the article on utility earnings in the October 6 issue of "Electrical World." It was titled "Utility Net Rose 7.2% in Slump."

We were distressed to read, however, the statement in the final paragraph to the effect that the Kentucky Power System had been granted a rate increase during the 12-month period ended June 30th.

Actually, Kentucky Power has never had a general rate increase and it has not had even a minor increase since an adjustment in industrial power rates back in 1949.

Thank you for permitting us to correct this statement.

Harold R. Johnson
Director of Public Relations
American Electric Power Service Corporation
30 Church Street
New York 8, N. Y.

We regret the error. Thanks for the correction.

Hydro Licenses Clarified

To the Editor:

On page 64 of the October 6 issue of ELECTRICAL WORLD there is a report of a hearing on the FPC practices in issuing licenses for constructed projects, a matter of considerable importance to many electric utilities. As stated in the article, this was a legally complicated hearing, for which reason it is not easy to comprehend precisely what is involved. Then, too, policies of the Commission with respect to the issuance of licenses for old power plants, referred to in the second column of the article, are not clearly reported and you may desire to note a correction.

In the first category are those constructed projects previously unauthorized which were constructed prior to 1920 or between 1920 and the date of the imposition of a license. Licenses for these projects constructed prior to 1920 have invariably been prescribed with a termination date of June 1970 (50 years from the passage of the Federal Power Act in 1920).

For those constructed between 1920 and the date of the imposition of a license, the Commission has prescribed a termination date of 50 years from the date of construction. In both groups the licenses have been made effective from January 1, 1938, the time when the Commission started its proceedings against unauthorized projects.

In the second category are those constructed projects previously unauthorized, with which a new development is proposed in the application for license. The Commission has regarded these in what might be termed a package arrangement and has invariably issued a 50-year license from the effective date of the license. The first license in this category was issued March 3, 1921, to Niagara Falls Power Company for the Niagara Falls Adams Station and the proposed Schoellkopf Station, and there have been seven more issued in this category in recent years. The effective, initial date of these "package" licenses has been either the date of the issuance of the license, or where there was a contest over FPC jurisdiction, the date of the determination of jurisdiction.

Since the basic purpose of the licensing provisions of the Federal Power Act is to secure comprehensive development and complete utilization of water-power resources, in harmony with other beneficial public uses, these 50-year-license permits for "package" proposals enable the Commission to assure comprehensive development and enable the company to have sufficient time under the license to warrant the new investment. New hydroelectric developments not only mean utilization of water resources, but are invariably accompanied by additional consumer investments for industrial and related purposes.

Willard W. Gatchell
General Counsel
Federal Power Commission
Washington 25, D. C.

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A complete picture, ready for transmission, is provided by a new transistorized television camera. It weighs only four pounds, including self-contained control and synchronizing units.

A radio telescope over four-hundred feet in diameter is planned for the hills of West Virginia.

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A miniature battery which is reported to last for five years, uses the radioisotope Prometheum 147. It is suitable for hearing aids, watches or missile guidance systems.

In California, it is proposed to use underground steam to generate electricity as is being done in Italy and New Zealand. Wells are now being drilled and a yield of 100,000 kilowatts is anticipated.

Two radio manufacturers have built extra service into their sets. One warns of approaching tornadoes and the other acts as a radiation detector.

Deuterium, or heavy hydrogen, is concentrated by some bacteria from sea water. This discovery may lead to a new and inexpensive method of producing the heavy water used in reactors.

The area behind the eye that can not be examined by other instruments can now be seen by a device that uses penetrating sound waves and converts their reflection into light.

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